Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2026

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Authority
Quality Assurance and Academic Accreditation Department

Academic Program Description Form for Colleges and Institutes

2025/2026

Bologna System

University: Basrah

College: Computer Science and Information Technology

Department: Intelligent Medical Systems

Date of filling out the file: 10/9/2026

Signature:

Head of the Department:

Lec. Dr. Mohamed A. Abdulhamid

Date: 20/9/2026

Signature:

Scientific Assistant:

Prof. Dr. Raida S. Khudher

Date:

File reviewed by: Quality Assurance and Performance Evaluation Division

Signature:

Name of Director of Quality Assurance and Performance Evaluation Division:

Lec. Asmaa Shareef

Date: 20/9/2026

The Dean's approval:

1. Program Vision

The College of Computer Science and Information Technology at the University of Basra strives to achieve leadership and excellence at both the regional and international levels, and to consolidate its position locally as a leading academic and research institution in the fields of computer science, information technology, and technological and digital innovations.

The College also aspires to be a distinguished center for preparing and qualifying scientific and technical competencies capable of leading the paths of digital transformation, anticipating the future, and employing knowledge and modern technologies in the service of society and sustainable development, through excellence in the fields of computer science, information systems, intelligent medical systems, cybersecurity, artificial intelligence, networks, and all other modern technical and digital fields and applications.

2. Program Mission

The College of Computer Science and Information Technology at the University of Basra is committed to fulfilling its academic, research, and societal mission through:

1. Offering integrated and advanced academic programs in the fields of computer science, computer information systems, intelligent medical systems, and cybersecurity, with future expansion into specializations such as artificial intelligence, networks, and other disciplines necessitated by emerging scientific developments and labor market requirements.
2. Preparing qualified graduates who possess scientific knowledge, technical skills, analytical and creative thinking abilities, and problem-solving capabilities, enabling them to compete and excel in the local, regional, and international job markets.
3. Keeping pace with the rapid developments in the fields of information technology and digital transformation, and employing them in advancing the educational and research processes to enhance the quality of academic outcomes.
4. Promoting applied scientific research and innovation, and encouraging collaboration and integration with industrial, medical, and governmental sectors, to contribute to devising innovative technological solutions to national challenges and supporting the pathways of sustainable development.
5. Building effective partnerships with academic, governmental, industrial, medical, and private sector institutions, to enhance the exchange of expertise and knowledge, and to support the digital economy and community development.
6. Providing an academic and research environment that stimulates lifelong learning, creativity, teamwork, commitment to professional ethics, and openness to the local and international community.

3. Program Objectives

First: Education and Learning

Continuously developing and updating curricula and academic programs in line with the rapid scientific and technological advancements in the fields of computing and information technology, and enhancing practical and applied teaching methods through the utilization of modern specialized laboratories, applied and field projects, thereby linking theoretical knowledge with real-world applications. The College also seeks to produce graduates who possess high scientific and technical competence, as well as professional and personal skills that qualify them to compete in the local, regional, and international job markets.

In addition to the above, the College aims to establish new academic programs and specializations that respond to labor market demands and future trends, particularly in the fields of artificial intelligence, networks, and other promising disciplines, and to contribute to promoting lifelong learning and developing students' skills to enable them to keep pace with the rapid transformations in the job market and technology.

Second: Scientific Research and Innovation

The College seeks to support and encourage applied and innovative scientific research, directing it toward addressing national challenges and issues, and investing its outputs and outcomes in developing solutions and applications in industrial, agricultural, medical, and technological fields, thereby contributing to achieving sustainable development and serving society. It also works to form and develop specialized research groups and teams in promising scientific and technical fields, particularly artificial intelligence, cybersecurity and information security, intelligent medical systems, data analytics, information systems, and other modern fields, in addition to elevating the level of scientific publishing and encouraging faculty members and researchers to produce and publish rigorous scientific research in peer-reviewed journals and prestigious local and international conferences. The College places special emphasis on fostering innovation, creativity, and technological entrepreneurship, and on supporting innovative initiatives and projects by students and faculty members, as well as expanding the scope of research collaboration and partnerships with universities, research centers, and governmental, industrial, and medical institutions, both locally and internationally, to enhance the exchange of expertise and knowledge, elevate the level of scientific research and innovation, and support the College's standing and its active contribution to scientific and technological development and community service.

Third: Community Service and Institutional Partnership

The College seeks to strengthen and enhance cooperation and partnership with educational, industrial, medical, and governmental institutions, exchange expertise and knowledge, and build effective strategic partnerships in the fields of technology and digital transformation, thereby reinforcing its academic and societal role and enabling the utilization of its scientific and technical expertise in the service of society. The College also works on providing consultancy and technical services, organizing training courses and professional development programs, contributing to

human capacity building, raising competence levels, and keeping pace with the requirements of digital transformation, in addition to employing academic and technical expertise to address societal challenges and contribute to achieving sustainable development goals. The College is also concerned with raising community awareness of the importance of cybersecurity, information security, and artificial intelligence, and promoting the safe and responsible use of technology, as well as fostering openness to the local and international community, expanding areas of scientific and research cooperation, and building sustainable relationships and partnerships with universities, centers, and research institutions within Iraq and abroad, contributing to the exchange of knowledge and expertise, enhancing innovation, and consolidating the College's position as an active partner in scientific, technological, and societal development.

Fourth: Institutional Development and Quality Assurance

The College seeks to develop its technical infrastructure and elevate the level of its laboratories and educational and research facilities in line with the requirements of modern education, scientific research, and innovation, and to enhance its capacity to keep pace with rapid developments in technical and academic fields. It also commits to applying national and international quality and academic accreditation standards, and strives to achieve academic accreditation in accordance with relevant international standards, including ABET standards, to ensure the elevation of the quality of academic programs and their outcomes. With a view to enhancing institutional performance efficiency, the College works on developing the capacities of its teaching, administrative, and technical staff through continuous training and professional development programs, alongside developing administrative and academic systems and transitioning toward digital management to enhance efficiency and transparency and improve the quality of services provided. The College is also committed to preparing and implementing sustainable strategic plans to develop its academic, research, and administrative systems, expand its programs, and establish new departments and specializations that align with scientific and technological developments and future labor market needs, in addition to embedding a culture of quality and continuous improvement across all academic, administrative, and research operations, thereby ensuring institutional excellence, enhancing the College's competitiveness, and consolidating its academic standing locally, regionally, and internationally.

Republic of Iraq - Ministry of Higher Education and Scientific Research

University of Basrah - College of Computer Science & Information Technology

Bachelor of Science in Intelligent Medical Systems (First cycle)

Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr

Program Curriculum (2023 - 2024)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي

جامعة البصرة - كلية علوم الحاسوب وتكنولوجيا المعلومات

بكالوريوس علوم في الأنظمة الطبية الذكية (الدورة الأولى)

أربع سنوات (ثمانية فصول دراسية) - 240 وحدة اوربية - كل وحدة اوربية = 25 ساعة

المنهاج الدراسي المحدث للعام 2025-2026

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem			
UGI	One	1	UOB101	English Language I	اللغة الانكليزية 1	2						3	33	17	50	2.00	S	
		2	IMS102	Applied Mathematics for Health Informatics	الرياضيات التطبيقية في المجال الصحي	2			1			3	48	52	100	4.00	B	
		3	IMS103	Computer Programming I	البرمجة 1	2		2		1		3	78	97	175	7.00	C	
		4	IMS105	Computer Fundamentals	اساسيات الحاسبات	2		2				3	63	62	125	5.00	B	
		5	IMS106	Biology	علم الاحياء	2		2		1		3	78	72	150	6.00	C	
		6	IMS107	Medical Terminology	مصطلحات طبية	2						3	33	67	100	4.00	C	
		7	UOB102	Human Rights and Democracy	الديمقراطية و حقوق الانسان	2						3	33	17	50	2.00	S	
						14	0	6	1	2	0	21	366	384	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem			
UGI	Two	1	IMS104	Computer Programming II	البرمجة 2	2		2		1		3	78	97	175	7.00	C	IMS103
		2	IMS108	Logic Design	تصميم منطقي	2		2				3	63	37	100	4.00	C	\
		3	IMS109	Bioinformatics	معلوماتية حيوية	2		2		1		3	78	97	175	7.00	C	\
		4	IMSI110	Anatomy	علم التشريح	2						3	33	12	75	3.00	B	IMS106
		5	IMS111	Physiology	علم الفسلجة	2		2				3	63	12	75	3.00	B	IMS106
		6	IMS112	Fundamentals of Health informatics	مبادئ المعلوماتية في المجال الصحي	2						3	33	37	70	4.00	B	\
		7	UOB104	Arabic Language 1	اللغة العربية 1	2						3	33	17	50	2.00	S	\
						14	0	8	0	2	0	21	381	309	720	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem			
UGII	Three	1	IMS202	Discrete Mathematics	هياكل متقطعة	2			1			3	48	52	100	4.00	C	\
		2	UOB201	English Language II	اللغة الانكليزية 2	2						3	33	17	50	2.00	S	\
		3	IMS203	Object Oriented Programming	البرمجة الكائنية	2		2		1		3	78	97	175	7.00	C	\
		4	IMS205	System Analysis and Design	تحليل وتصميم النظم	2						3	33	92	125	5.00	C	\
		5	IMS206	Data Structures and Algorithms	هياكل البيانات والخوارزميات	2		2				3	63	87	150	6.00	C	IMS104
		6	IMS207	Communication Diseases	الامراض المعدية او الانتقالية	2						3	33	67	100	4.00	B	\
		7	UOB205	Crimes of the Baath Regime in Inaq	جرائم نظام البعث في العراق	2						3	33	17	50	2.00	S	\
						14	0	4	1	1	0	21	321	429	750	30.00		702

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem			
UGII	Four	1	IMS204	Advanced Object Oriented Programming	البرمجة الكائنية المتقدمة	2		2		1		3	78	97	175	7.00	C	IMS203
		2	IMS208	Fundamentals of Health Database Systems	أساسيات أنظمة قواعد البيانات الصحية	2				1		3	48	77	125	5.00	C	\
		3	IMS209	Operating Systems	أنظمة التشغيل	2		2				3	63	62	125	5.00	C	\
		4	IMS210	Epidemiology and Biostatistics for health informatics	علم الأوبئة والإحصاء الحيوي	2		2				3	63	62	125	5.00	C	\
		5	IMS211	Medical Data Acquisition Methods	طرق جمع البيانات الطبية	2						3	33	42	75	3.00	B	\
		6	IMS212	Health Service Management System	نظام أدارة الخدمات الصحية	2		2				3	63	12	75	3.00	B	\
		7	UOB204	Arabic Language 2	اللغة العربية 2	2						3	33	17	50	2.00	S	
						14	0	8	0	2	0	21	381	369	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
UGIII	Five	1	IMS301	Web Development	تطوير مواقع الويب	2		2				3	63	62	125	5.00	B	IMS203
		2	IMS302	Artificial intelligence	الذكاء الاصطناعي	2				1		2	47	78	125	5.00	C	IMS104
		3	IMS303	Computer Networks	شبكات الحاسب	2		2				3	63	62	125	5.00	C	\
		4	IMS304	Software Engineering	هندسة البرامجيات	2				1		2	47	78	125	5.00	C	IMS205
		5	IMS305	Medical Image Processing	معالجة الصور الطبية	2		2				3	63	62	125	5.00	C	IMS104
		6	IMS306	Geographical Information Systems	أنظمة المعلومات الجغرافية	2						2	32	93	125	5.00	E	\
						12	0	6	0	2	0	15	315	435	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Six	1	IMS307	Electronic Health Records	السجلات الصحية الإلكترونية	2		2				3	63	62	125	5.00	C	IMS208
		2	IMS308	Data Mining	تنقيب البيانات	2				1		2	47	78	125	5.00	C	IMS211
		3	IMS309	Application Development	تطوير التطبيقات	2		2				3	63	62	125	5.00	C	IMS301
		4	IMS310	Computer Vision	الرؤية الحاسوبية	2		2				3	63	62	125	5.00	C	IMS305
		5	IMS311	Simulation and Modeling in Medical Applications	المحاكاة والنمذجة في التطبيقات الطبية	2						2	32	93	125	5.00	B	\
		6	IMS312	Machine Learning	التعلم الالي	2				1		2	47	78	125	5.00	C	IMS302
						12	0	6	0	2	0	15	315	435	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
UGIV	Seven	1	IMS401	Human and Computer Interaction	تفاعل الإنسان والحاسوب	2				1		2	47	103	150	6.00	C	\
		2	IMS402	Graduation Project I	مشروع التخرج 1	2		2			1	3	63	87	150	6.00	C	IMS204, IMS104
		3	IMS403	Mobile Applications	تطبيقات الهاتف المحمول	2		2				3	63	87	150	6.00	C	IMS309
		4	IMS404	Health Care Systems Administration	إدارة نظم الرعاية الصحية	2		2				3	63	87	150	6.00	C	IMS212
		5	IMS405	Wireless Sensor Networks	شبكات الاستشعار اللاسلكية	2				1		2	47	103	150	6.00	C	IMS303
						10	0	6	0	2	1	13	283	467	750	30.0		

	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
	Eight	1	IMS406	Internet of Things	أنترنيت الاشياء	2				1		2	47	103	150	6.00	C	IMS405
		2	IMS407	Information Security	أمنية المعلومات	2				1		2	47	103	150	6.00	C	\
		3	IMS408	Embedded Systems	الأنظمة المضمنة	2		2				3	63	87	150	6.00	C	IMS309
		4	IMS409	Graduation Project II	مشروع التخرج 2	2		2			1	3	63	87	150	6.00	C	IMS402
		5	IMS410	Cloud Computing	الحوسبة السحابية	2				1		2	47	103	150	6.00	C	IMS301
						10	0	4	0	3	1	12	267	483	750	30.0		
						100	0	48	2	16	2	139	2629	3311	5970	240.0		Must be 240 ECTS

Note: The student should complete 4 weeks of Summer Internships to fullfil the requirements of the Bachelor's degree

Structured SWL (hr/w) type		
	CL	Class Lecture
	Lab	Laboratory
	Pr	Practical Training
	Tut	Tutorial
	Lect	Online lecture
	Semn	Seminar

Module type		
	B	Basic learning activities
	C	Core learning activity
	S	Suport or related learning activity
	E	Elective learning activity

SWL:	Student Workload
SSWL:	Structured SWL
USSWL:	Unstructured SWL

Note: Columns O, Q and R are progrmaed, protected and should not be edited

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Applied Mathematics for Health Informatics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** **Practical** ☐ **Seminar**	
Module Code	**IMS102**				
ECTS Credits	**4**				
SWL (hr/sem)	**200**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	IMS		**College**	Type College Code	
Module Leader	Hadell ismail mustafa		**e-mail**	hadeel.mustafa@uobasrah.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Introducing the student to the concept of biological statistics and its importance 2. Introducing the student to the methodology of determining the appropriate sample size for the study and its properties, to ensure the accuracy of his statistical analysis. 3. Introducing the student to all descriptive statistics measurements and indicating their importance in describing the extent to which the study sample represents its population. 4. Introducing the student to the most important statistical tests that he needs to compare between the variables of the study. 5. Explain the methods of measuring the correlation between variables.
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. The course includes introducing the concept of biological statistics and explaining the scientific terminology 2. then moving to the concept of normal distribution in detail and clarifying its importance in biological statistics 3. and the extent to which statistical tests are adopted on. 4. After the we'll pass to the pure statistical topics that involves central tendency and dispersion measurements, the statistical methods in determining the size of the sample and how to collect it and ensure that it conforms to the statistical conditions such as the normal distribution, skewness and kurtosis, and its conformity with the criteria of its population. 5. the extent of the importance of these criteria in the statistical analysis and decision based on the analyzed results. 6. After that, we'll transfer to the parametric and non-parametric statistical tests, how to use each of them to compare the averages of the tested samples. 7. then we move to the methods of measuring the correlation between variables and the methods of statistical prediction using linear and multiple regression.
Indicative Contents	Indicative content includes the following. Part A – introduction to Biostatistics Data Tabulation and Graphic Representation, Explanation of Data Statistical Symbol, Measures of Central Tendency, Measures Dispersion and variance. [12 hrs] Part B- samples and Its Properties Measures of Confidence Intervals, Covariance Index, Measures of skewness and

	Kurtosis, Test the Normal Distribution and how to process Data that it is not Normally Distributed with Brief review of the Previous Topics. [12 h] Part C – Study the Relationship Between Variables (Correlation Coefficient) T-test, Chi Square Test. [6 h] Part D –Simple Linear Regression, Multiple Regression [6 h]

Learning and Teaching Strategies	
Strategies	This module will be delivered to the student through theoretical and practical lectures to clarify the basics of biostatistics and its importance in health informatics and encourage the student to get practice through participating in practical exercises and solving statistical problems using professional computer applications such as SPSS.

Student Workload (SWL)			
Structured SWL (h/sem)	48	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	52	**Unstructured SWL (h/w)**	3.4
Total SWL (h/sem)	**100**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All

	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction to Biostatistics
Week 2	Data tabulation and graphic representation
Week 3	Explanation of Statistical Symbols, Measures of Central Tendency
Week 4	Measures of dispersion and variance
Week 5	Sample and its properties, measurement of confidence intervals
Week 6	Covariance index, measures of skewness and Kurtosis
Week 7	Test the normal distribution and how to process data that is not normally distributed with a brief review of the previous Topics
Week 8	Assignment 1
Week 9	Test the normal distribution and how to process data that is not normally distributed with a brief review of the previous Topics
Week 10	Study the relationship between variables (correlation coefficient)
Week 11	T test
Week 12	chi square test
Week 13	Assignment 2
Week 14	Simple Linear Regression
Week 15	Multiple regression
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	
Week 2	
Week 3	

Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	[1] Al-Rawi, Khashie M. 1984. Introduction to the statistcs. Univ. of Mousil press.	Yes
Recommended Texts	[2] Kallner A. 2014. LABORATORY STATISTICS. Elsevier Inc. USA. PP:139. [3] George D. and Mallery P. 2019. IBM SPSS Statistics 25 Step by Step. 14th ED. Taylor & Francis. USA. PP:386.	Yes
Websites		

Grading Scheme

Group	Grade		Marks %	Definition
Success Group (50 - 100)	**A** - Excellent		90 – 100	Outstanding Performance
	B - Very Good		80 – 89	Above average with some errors
	C - Good		70 – 79	Sound work with notable errors
	D - Satisfactory		60 – 69	Fair but with major shortcomings
	E - Sufficient		50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail		(45-49)	More work required but credit awarded
	F – Fail		(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Programming I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS103**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	IMS		**College**	CSIT	
Module Leader	Ali Z. Sharhan		**e-mail**	ali.zamil@uobasrah.edu.iq	
Module Leader's Acad. Title	Assist Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor	Ali Z. Sharhan		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	2.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	IMS104 Computer Programming II	**Semester**	2/Level 1

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**1.** Learn of programming languages provides added insight into other fields. **2.** Learn an understanding of the effective and responsible use and management of program language is important for managers and other business knowledge workers in today's global information Society. **3.** Learn that people must understand the components of programming langauge and how all of these components work together to bring value to an organization. **4.** We need to turn our attention to the role that programming language playin today's global information Society.. **5.** The competitiveness of most companies is in a large degree based on the effective use of information systems, therefore we must to think about what advantages and disadvantages Can bring to the businesses and society the integrating information system. **6.** what a programming languge ? A languge is a group of interrelated statement working together toward a common goal by accepting inputs and producing outputs in an organized transformation process **7.** why learing algorithm? **8.** why learing Flowchart? **9.** Why learn about Basic input/output? **10.** Why learn about loop type? - for..loop - while..loop **11.** Why Learn about functions? - Defining a Function, Calling a Function, Function Arguments (Call by value, Call by Reference)
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1-** Give the student the most important skills to become a Python power users have a broad understanding of Python language and they know which tool or function is best used in a given situation. **2-** Learn the most important skills to deal with if statement and nested if statement. **3-** Learn the most important skills to deal with for statement and nested for statement.(Loop types) **4-** Learn how to write and use the most important functions **5-** 10. Trace the execution of a variety of code segments and write summaries of their computations. **6-** 11. Identify common coding errors and apply strategies for avoiding such errors. **7-** 12. Apply a variety of strategies to the testing and debugging of simple programs. **8-** 13. Use of an appropriate IDE (Integrated Development Environment)

	to create, compile and run a program developed by the selected programing language.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** • Introduction to Programming & Problem-Solving • Algorithm Design • Flowcharts and Pseudocode • Data Types, Variables, Constants, and Literals • Basic Input/Output and Operators • Mathematical Functions and Strings • Decision-Making Statements (Selections) • Loop Types: While and For • Functions: Definition, Calling, Parameters (By Value, By Reference) • Debugging and Error Handling Basics • Project Development and Presentation

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Lectures to introduce fundamental programming concepts. • Hands-on lab sessions for practical programming exercises. • Tutorials to reinforce problem-solving skills and algorithmic thinking. • Project-based learning through small assignments and a final project presentation. • Use of an IDE to enhance students' programming, testing, and debugging experience. • Continuous formative assessments (quizzes, lab tasks, mini-project) to strengthen learning outcomes.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10% (10)	7,11 and 14	LO #1, #2, #3 and #10, #11
	Assignments	2	10% (10)	3 and 13	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO #7, #8 and #10, #12
Summative assessment	**Midterm Exam**	1hr	10% (10)	9	LO #1 - #9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to computer programming language and problem - solving
Week 2	Algorithms design
Week 3	Flowcharts and pseudocode
Week 4	Python syntax, data types and variable types
Week 5	Constants / literals and basic input/output
Week 6	Mathematical functions and string operations
Week 7	Decision-making statements (selections)
Week 8	Selections (continued)
Week 9	**Midterm exam**
Week 10	Loop types (while..loop)
Week 11	Loop types (for ..loop)
Week 12	Functions
Week 13	Functions (continued)
Week 14	**Presentation of final mini - project**
Week 15	**Prepare to final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to **Python** and **IDE** setup, run scripts.
Week 2	Write first programs
Week 3	Practice writing pseudocode & simple flowcharts; small group exercise.
Week 4	Working with Data Types and Variables
Week 5	Constants, Literals, and Basic Input/Output
Week 6	String parsing/Formatting tasks, numeric utilities
Week 7	If Statements
Week 8	Nested If Statements
Week 9	Midterm Exam (no lab)
Week 10	While loop examples
Week 11	For loop examples
Week 12	Functions (definition and calling)
Week 13	Functions (with parameters and practice)
Week 14	Project work & Quiz
Week 15	Final Exam *(no lab)*

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Liang, Y. D. (2013). Introduction to programming using Python. Pearson.	No
Recommended Texts	Matthes, E. (2023). Python crash course: A hands-on, project-based introduction to programming. no starch press.	No
Websites	https://www.guru99.com/pythontutorials.html https://www.w3schools.com/python/python_intro.asp	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Fundamentals**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory**	
Module Code	**IMS105**			☒ **Lecture**	
ECTS Credits	**5**			☐ **Lab**	
SWL (hr/sem)	**125**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	1	**Semester of Delivery**	1		
Administering Department	IMS	**College**	CSIT		
Module Leader	Dr. Mustafa Moosa Qasim	**e-mail**	mustafa_mq87@uobasrah.edu.iq		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.		
Module Tutor	Dr. Mustafa Moosa Qasim	**e-mail**	E-mail		
Peer Reviewer Name	Name	**e-mail**	E-mail		
Scientific Committee Approval Date		**Version Number**	2.0		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	No	**Semester**	
Co-requisites module	No	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To learn and understand how computer systems work. 2. To learn and understand computer terminology. 3. To understand an overview of the history of computers. 4. To overview the basic types of computers in use today. 5. To learn about the organization and architecture of computers. 6. To understand input and output devices. 7. To learn and understand storage devices. 8. To learn hardware and software computer systems. 9. To learn computer number systems and data representations. 10. To learn and understand what computers are and how they are used. 11. To describe the parts of typical desktop personal computers. 12. To describe the computer users and professionals. 13. To learn and understand how computers fit every need. 14. To describe the inside of the system unit in detail. 15. To learn and understand the PC Technician Professional Best Practices. 16. To learn and understand the operating system fundamentals. 17. To discuss the various types of optical discs available and how they differ from each other. 18. To describe the essential elements and duties of computer operating systems. 19. To learn and understand the Microsoft Windows installations, which are maintained, configured, and installed. 20. To learn and understand a brief overview of the architectural analysis of computer systems and their components, including the execution unit, arithmetic and logical (ALU) unit, and memory unit. 21. To learn and understand the General Properties of Storage Systems 22. To provide more details about understanding how to use computers today and tomorrow.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the components of standard desktop personal computers. 2. Identify fundamental components and functions of personal computer operating systems. 3. Identify best practices followed by professional personal computer technicians. 4. Install and configure computer components. 5. Install and configure system components. 6. Maintain and troubleshoot peripheral components. 7. Troubleshoot system components. 8. Install and configure operating systems. 9. Maintain and troubleshoot installations of Microsoft Windows.

	10. Students will be introduced to the design and analysis of a computer system's hardware and its components, including the execution unit, arithmetic and logical (ALU) unit, and memory unit. 11. Understanding how to use computers today and tomorrow in our lives. 12. The ability to learn and work in groups.
Indicative Contents المحتويات الإرشادية	**1. What computers are, how they are used.** • An overview of the history of computers. • Computer terminology. • The basic types of computers in use today. • Describe the parts of typical desktop personal computers System Unit Components. • Hardware in general. • Software in general. **2. How are Computers to Fit Every Need.** • Computer Users and Professionals. • Categories of computers. • Embedded Computers in detail with examples. • Personal Computers in detail with examples. • Mobile Devices in detail with examples. • Portable Computers in detail with examples. • Describe Inside the system unit. **3. Personal Computer Technician Professional Best Practices.** • Digital Data Representation. • Processing Speed. • Bus Width, Bus Speed, and Bandwidth. • Memory details. • Logical vs. Physical Representation. • Diagnostics and Troubleshooting. **4. Operating System Fundamentals** • Personal Computer Operating Systems. • Windows User Interface Components. • Windows File System Management. • Windows System Management Tools. **5. Installing and Configuring Peripheral Components.** • Install and Configure Display Devices. • Install and Configure Input Devices. • Install and Configure Adapter Cards. • Install and Configure Multimedia Devices.

	6. Maintaining and Troubleshooting Peripheral Components. • Troubleshoot Display Devices. • Maintain and Troubleshoot Input Devices. • Troubleshoot Adapter Cards. • Troubleshoot Multimedia Devices. **7. Troubleshooting System Components.** • Troubleshoot Power Supplies. • Troubleshoot Memory. • Troubleshoot CPUs. • Troubleshoot System Boards. **8. Installing and Configuring Operating Systems.** • Install Microsoft Windows. • Upgrade Windows. • Add Devices to Windows. • Optimize Windows. **9. Introduction to Computer Architecture.** • Hardware, Software, and Firmware. • Basics of Computer Architecture. • Computer Structures. **10. Computer Instruction Set.** • Instruction Types. ➢ Data Transfer Instructions. ➢ Arithmetic Instructions. ➢ Logical Instructions. ➢ Program-control Instructions. ➢ System-control Instructions. • I/O Instructions. **11. Memory Organization**. • Memory definition. • Memory Types. • RAM Types. • ROM Types. • Difference between RAM and ROM. **12. General Properties of Storage Systems.** • Describe the two most common types of hard drives and what they are used for today. • Discuss the various types of optical discs available and how they differ from each other. • Identify some flash-memory-based storage devices and media and explain how they are used today.

	• List at least three other types of storage systems. **13. Understanding how to use Computers Today and Tomorrow in our Life.** • Examples with case study.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises while, at the same time, refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and solving exercises.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (hr/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (hr/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 - 10	#1، #3، #7 و #8
	Assignments	2	10% (10)	2 - 12	#3، #4، #6 ، و #7
	Projects / Lab.	1	10% (10)	Continuous	All

	Report	1	10% (10)	13	#5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	10	#1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1,2	What computers are, how they are used.
Week 3	How are Computers to Fit Every Need.
Week 4	Personal Computer Technician Professional Best Practices.
Week 5	Operating System Fundamentals.
Week 6	Installing and Configuring Peripheral Components.
Week 7	Maintaining and Troubleshooting Peripheral Components.
Week 8	Troubleshooting System Components.
Week 9	Installing and Configuring Operating Systems.
Week 10	**Mid-term Exam.**
Week 11	Introduction to Computer Architecture.
Week 12	Computer Instruction Set.
Week 13	Memory Organization.
Week 14	General Properties of Storage Systems.
Week 15	Understanding how to use Computers Today and Tomorrow in our Life.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	First Look at Computer Parts and Tools
Week 2	Introducing Windows Operating Systems
Week 3	All about Motherboards & Supporting Processors and Upgrading Memory
Week 4	Supporting Hard Drives
Week 5	Installing Windows
Week 6	Satisfying Customer Needs
Week 7	PC Maintenance and Troubleshooting Strategies
Week 8	Maintaining Windows and Optimizing Windows
Week 9	Troubleshooting Windows and Applications and Troubleshooting Windows Startup Problems
Week 10	**Mid-term Exam.**
Week 11	Introduction To Microsoft Word 2021
Week 12	Introduction To Microsoft Excel 2021
Week 13	Introduction To Microsoft PowerPoint 2021
Week 14	Exercises and tutorials.
Week 15	Exercises and tutorials.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. (Wiley series on parallel and distributed computing) Abd-El-Barr M., El-Rewini H. - Fundamentals of Computer Organization and Architecture-Wiley (2005) 2. Michael Meyers-Mike Meyers CompTIA A+ Guide_ Essentials Lab Manual, Third Edition (Exam 220-701) (Mike Meyers' Computer Skills) (2010) 3. CH Roth Jr, LL Kinney, EB John. Fundamentals of logic design- Cengage Learning (2013) 4. Morley, Deborah, and Charles S. Parker. Understanding computers: Today and tomorrow, comprehensive. Cengage Learning, (2010)	No (E-copy)

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Biology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	IMS106				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		1	**Semester of Delivery**		1
Administering Department		IMS	**College**	CSIT	
Module Leader	Labeed Abdullah Najim Al-Saad		**e-mail**	labeed.najim@uobasrah.edu.iq	
Module Leader's Acad. Title		lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Amani Hussain Hameed		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		2.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Anatomy, Physiology, and Bioinformatics	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	• Describe levels of organization and related functions in plants and animals. • Identify the characteristics and basic needs of living organisms and ecosystems. • Explain the processes of growth and development in individuals and populations. • Design and critically assess the scientific investigations they perform. • Demonstrate critical thinking skills.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Define clearly what is meant by "life" and "living organisms". • Explain why biology on Earth is based on the chemistry of carbon and analyze the potential for biology based on other elements. • Define basic biological concepts and processes. • Describe levels of organization and related functions in plants and animals. • Identify the characteristics and basic needs of living organisms. • Explain the processes of growth and development in individuals and populations. • Describe the relationships between organisms and their environment. • Outline the structure of the biomolecules found in all living organisms. • Describe the function and structure of cells including the metabolic reactions that occur in cells. • Explain the process of inheritance. • Describe how RNA, DNA and proteins are synthesized. • Explain the process of cell division in both somatic and germ cells. • Explain the processes by which animals acquire nutrients, water and oxygen, eliminate wastes, protect against foreign substances, acquire information about their environment and reproduce. • Generate a hypothesis from a set of observations and then design experiments to test the hypothesis. • Connect everything mentioned above to computer science and the concept of computational biology.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Each section begins with an overview, which puts the topic into a broader biological context and encourages understanding of the place of each topic within the subject. The overview is intended to encourage an overarching approach to both the teaching and learning of topic areas. As such, it will not be directly assessed. These specifications contains the specification content that all students must cover and that can be assessed in written papers and opportunities for skills to be developed throughout the course.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to biology

Week 2	The Cell
Week 3	The Cell
Week 4	Key Biomarkers for Cell Organelles and Their Employment in Intelligent Medical Systems Applications
Week 5	Prokaryotes and Eukaryotes
Week 6	Mitosis and mitosis
Week 7	Mitosis and mitosis
Week 8	Mid Exam
Week 9	Tissue types, epithelial tissue, connective tissue, muscular tissue, smooth tissue
Week 10	Tissue types, epithelial tissue, connective tissue, muscular tissue, smooth tissue
Week 11	Biological Macromolecules, carbohydrate, protein, lipids
Week 12	Nucleic acid, DNA, RNA
Week 13	DNA Replication
Week 14	Nucleic Acid Investigation Techniques
Week 15	**Final Exam**
Week 16	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Laboratory safety
Week 2	Parts of microscope
Week 3	Types of cells, mitosis and meiosis
Week 4	Tissue types
Week 5	Human Blood, W.B.C , R.B.C
Week 6	Practical Python Lab Lecture: Core Biomarker Analysis: Diabetes Screening with Blood Glucose
Week 7	Practical Python Lab Lecture: Core Biomarker Analysis: Multi-Biometer Panel for Vital Signs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**

Required Texts	Biology by Neil A. Campbell	No
Recommended Texts	Biological Science by Scott Freeman, Kim Quillin, Lizabeth Allison, Michael Black, and Emily Taylor Python Programming for Biology: Bioinformatics and Beyond, Tim J. Stevens and Wayne Boucher. 2015 Python for Biologists: A Complete Programming Course for Beginners, Dr. Martin Jones. 2013	No
Websites	https://alleninstitute.org/materials-library/?gad_source=1&gclid=Cj0KCQiAo7KqBhDhARIsAKhZ4ujCQ0oRF-RqtBSnSMMb2n30NK4k0N7RbXqyp44u4rckPZzaLPb8cb8aAui7EALw_wcB https://www.pythonforbiologists.org/	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Medical Terminology**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS107**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level			**Semester of Delivery**	1	
Administering Department	IMS		**College**	CSIT	
Module Leader	Firas Jabbar Taresh		**e-mail**	Firas.j.taresh@stu.edu.iq	
Module Leader's Acad. Title	Assist. Lec		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To have an idea about common terminology in medicine 2. To have knowledge about applied terms 3. This course deals with the basic concept of terminology. 4. This is the basic subject for all medical terms related to body system. 5. To understand terms in concern of medical physics. 6. To know statistical terms of medicine.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognize how to use medical terms in their corresponding issue. 2. List the various terms associated with diseases, diagnosis and therapy. 3. Know the synonyms of medical terminology. 4. Discuss abbreviations of medical terminology. 5. Describe applied human anatomy. 6. Define informative biomedicine. 7. Identify special words when writing papers. 8. Discuss research parameters. 9. Discuss citation in medical publications. 10. Explain terms related to medical and laboratory tests. 11. Identify terms of medical tools.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A Introduction [15 hrs] history of medicine English language, story-based medicine, disease story [15 hrs] biomedical perspectives ideas and believes, worries, disease illness model, body systems, patient language and doctor language, open and closed interview, listening in medical practice [10 hrs]. skills, professionality tradional medical history psychosocial orientation Summarization, Part B – clinical data, laboratory data, medical terms, 15h

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Flipped class will be considered as teaching strategy

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدرا يس المنتظم للطالب خلال الفصل	31	**Structured SWL (h/w)** الحمل الدرا يس المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem)	69	**Unstructured SWL (h/w)** الحمل الدرا يس غ ري المنتظم للطالب أسبوعيا	4.6

الحمل الدرا يس غ ري المنتظم للطالب خلال الفصل			
Total SWL (h/sem) الحمل الدرا يس الك يل للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10 % (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10 % (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10 % (10)	Continuous	All
	Report	1	10 % (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2 hr	10 % (10)	7	LO #1 - #7
	Final Exam	3 hr	50 % (50)	16	All
Total assessment			100% (100) Mark		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction – History of Medicine
Week 2	Medical communication and interviewing skills
Week 3	Health and Disease definition with disease progression
Week 4	Health environment relevant to sterilization in health centers
Week 5	Library and information technology
Week 6	Terms of applied human anatomy
Week 7	Patient language and doctor language
Week 8	Terms related to posture, examination, and laboratory investigations
Week 9	Interpretation of data outcome
Week 10	Clinical data
Week 11	Patient perspective
Week 12	Biomedical perspective
Week 13	Medical conversation technique, patient relevant interview and history taking

Week 14	Synonymous and abbreviations
Week 15	Medical conventional dictionary

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Medicine	Yes
Recommended Texts		No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Programming II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS104**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		1	**Semester of Delivery**		2
Administering Department		IMS	**College**	CSIT	
Module Leader	Ali Z. Sharhan		**e-mail**	ali.zamil@uobasrah.edu.iq	
Module Leader's Acad. Title		Assist Lecturer	**Module Leader's Qualification**		MSc
Module Tutor	Ali Z. Sharhan		**e-mail**	ali.zamil@uobasrah.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	2.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMS103 Computer Programming II	**Semester**	2/ Level 1
Co-requisites module	IMS206 Data structures and Algorithms	**Semester**	1/ Level 2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**1-** To strengthen students' understanding of Python programming constructs and their applications in computational problem solving. **2-** To develop the ability to design, implement, and test efficient Python programs using loops, functions, strings, and arrays. **3-** To introduce File Handling in Python, enabling students to store, retrieve, and process external data. **4-** To provide an introductory understanding of Basic Data Structures (Lists, Tuples, Dictionaries, and Sets) for solving structured problems. **5-** To enhance critical thinking, logical reasoning, and programming skills through theory, lab practice, and applied assignments.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**Upon successful completion of this module, students will be able to:** **1-** Demonstrate a solid understanding of Python programming constructs (loops, functions, strings, arrays). **2-** Apply programming knowledge to design, write, and test Python solutions for computational problems. **3-** Implement and manipulate file input/output operations in Python. **4-** Apply basic data structures (Lists, Tuples, Dictionaries, Sets) in solving real-world tasks. **5-** Exhibit independent problem-solving skills and the ability to work on applied programming projects.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** • Review of Python fundamentals: variables, operators, input/output. • Control structures: if, nested if, for loop, while loop, nested loops. • Functions: definition, parameters, arguments, return values, scope. • Strings: declaration, operations, and built-in functions. • Arrays: one-dimensional and two-dimensional arrays (declaration and functions). • **File Handling in Python:** reading, writing, and appending text files. • **Basic Data Structures:** introduction to Lists, Tuples, Dictionaries, and Sets.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Lectures for core concepts and examples. • Weekly hands-on lab sessions aligned with theory topics. • Assignments and small programming tasks for formative assessment. • A term project (individual or group) with milestones and final presentation. • Use of IDEs and version control basics (recommended: Git basics). • Peer review and short code walk-throughs to develop reading/debugging skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	7,11 and 14	LO #1, #2, #3 and #10, #11
	Assignments	2	10% (10)	3 and 13	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO #7, #8 and #10, #12
Summative assessment	**Midterm Exam**	1hr	10% (10)	9	LO #1 - #9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Computer Programming II – review of Python basics
Week 2	Looping structures: for, while, nested, break/continue
Week 3	Loop applications (patterns and series integration)
Week 4	Functions: definition, parameters, return values
Week 5	Functions with loop applications
Week 6	Strings: declaration, manipulation, and functions
Week 7	**Midterm Exam**
Week 8	One-dimensional arrays: introduction and applications
Week 9	Two-dimensional arrays: introduction and applications
Week 10	Functions with arrays
Week 11	Basic Data Structures (Lists & Tuples)
Week 12	Basic Data Structures (Dictionaries & Sets)
Week 13	File Handling in Python
Week 14	**Project Presentation and Discussion**
Week 15	**Final Exam Review**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	practice on looping structures
Week 2	Loop applications (patterns and series)
Week 3	problem-solving with loops
Week 4	functions (definition and usage)
Week 5	Functions with loop applications
Week 6	String operations and built-in functions
Week 7	One & Two dimensional arrays (implementation)
Week 8	**Midterm Exam – *No Lab***
Week 9	One & Two dimensional arrays (countinued)

Week 10	functions with arrays
Week 11	Lists and Tuples (storing and processing structured data)
Week 12	Dictionaries and Sets (key-value and unique data handling)
Week 13	File handling (open, read, write and append files)
Week 14	**Quiz**
Week 15	**Project Presentation and Discussion**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Liang, Y. D. (2013). Introduction to programming using Python. Pearson.	No
Recommended Texts	Barry, P. (2016). Head first Python: A brain-friendly guide. " O'Reilly Media, Inc.".	No
Websites	Official Python Documentation: https://docs.python.org/3 Additional Python Notes and Tutorials: https://www.geeksforgeeks.org/python/python-programming-language-tutorial/	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Logic Design**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS108**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	IMS		**College**	CSIT	
Module Leader	Dr. Mustafa Moosa Qasim		**e-mail**	mustafa_mq87@uobasrah.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	2.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course primarily helps students prepare for professional work in the field of logic design. Students should be able to apply knowledge of science and engineering, as well as the number systems method, where each number is represented by a string of symbols where each symbol is associated with a specific weight depending upon its position. Additionally, the course will cover techniques, skills, and modern engineering tools for analyzing, designing, and optimizing logic circuits. In addition, this course provides a modern introduction to logical design and the basic building blocks used in digital systems, in particular digital computers. The students will be introduced to introductory logic design and its principles of operation, analysis, and design. In short, they will learn how to use this knowledge to better adjust the level of technology content for both electrical and computer engineering and computer science students in the department of intelligent medical systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, students will be able to: 1. Using number systems, and it applies to the material of logic systems. 2. Be familiar with truth tables and how to use them for analysis and design. 3. Using switching algebra and the implementation of switching functions using the common gates AND, OR, NOT, NAND, NOR, Exclusive-OR, and Exclusive-NOR. 4. Simplification of combinational logic circuits by using a Karnaugh map. 5. Analyze and design larger combinational logic circuits. 6. Analyze sequential logic circuits. 7. Ability to analyze and design a system, component, or process to meet desired needs. 8. Ability to analyze, design, and conduct experiments. 9. In addition to the measurable student learning outcomes listed above, the students will be able to demonstrate their knowledge of the course material by analyzing real problems through laboratory experiments. 10. The ability to apply their skills in a variety of practical sciences.
Indicative Contents المحتويات الإرشادية	**1. Number systems** • Positional number system. • Binary digits (bits).

	• Convert from binary to decimal. • Decimal to binary. • Hexadecimal (hex). • Octal numbering systems. • Converting between the four numbering systems (decimal, binary, Hex and octal). • Fraction of number system. • Signed and unsigned binary numbers. • Two's complement, binary addition. • Subtraction. • Binary coded decimal (BCD) codes. • ASCII code. • Gray code. **2. Combinational Logic Circuits and switching algebra.** • Switching algebra. • Properties of switching algebra**.** • Development of a truth table. • Manipulating algebraic functions. • Sum of products (SOP). • Product of sum (POS). **3. Switching algebra and logic gates.** • Implementation of switching functions using networks of AND gates. • OR gates. • NOT gates. • DeMorgan's theorem. • From truth table to algebraic expression. • Exclusive-OR gates • Simplifying algebraic expressions. • Consensus operator. **4. Karnaugh map.** • Two, three, and four-variable Karnaugh map. • Minimum SOP expressions using the Karnaugh map. • Finding a minimum product of sums (POS) expression. • Five and six-variable Karnaugh map. • Economize by sharing gates. **5. Designing Combinational system.** • Design 1-bit and 2-bits full adder design 1-bit subtractor. • Subtractor/ adder. • Comparators. • Binary decoders.

	• Binary encoder. • Multiplexe and Demultiplexe. **6. Analysis of sequential systems.** • D, S-R, T. • J-K flip flops. • flip flop with clear and present inputs, timing for flip flop. • Moore model circuit. • Mealy model analysis.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises through class and laboratory experiments. The objective of this module is to serve as a cornerstone for the learning of logic design, digital system design, and computer design by students. At the same time, discussion of combinational logic: logic gates, minimization techniques, arithmetic circuits, and modern logic devices such as field programmable logic gates. This mission will be accomplished through group discussions, classes, reports, feedback, assignments, and interactive tutorials and by considering types of simple experiments and exercises that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 - 10	#1، #3، #7 و #8
	Assignments	2	10% (10)	2 - 12	#3، #4، #6 ، و #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	#5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	10	#1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Number Systems.
Week 2	Number Systems.
Week 3	Number Systems.
Week 4	Number Systems.
Week 5	Combinational Logic Circuits and switching algebra.
Week 6	Combinational Logic Circuits and switching algebra.
Week 7	Switching algebra and logic gates.
Week 8	Switching algebra and logic gates.
Week 9	Switching algebra and logic gates.
Week 10	**Mid-term Exam.**
Week 11	Karnaugh map.
Week 12	Karnaugh map.
Week 13	Designing Combinational system.
Week 14	Designing Combinational system.
Week 15	Designing Combinational system.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Logic circuit design software and installation method.
Week 2	Learning how to choose the appropriate software of in logic circuits design that are easy to use and have sustainability. Learning how to use interfaces of logic circuits design program.
Week 3	Introduction Logic Gates. AND Gate and Logic Diagram. Examples with Exercises.
Week 4	OR Gate and Logic Diagram. Examples with Exercises.
Week 5	NOT Gate and Logic Diagram. Examples with Exercises.
Week 6	NAND Gate and Logic Diagram. Examples with Exercises.
Week 7	NOR Gate and Logic Diagram. Examples with Exercises.
Week 8	XOR Gate and Logic Diagram. XNOR Gate and Logic Diagram. Examples with Exercises.
Week 9	Logic circuits and solving problems. Drawing the truth table from a given logic circuit. Designing a logic circuit from a given problem and testing it by also drawing a truth table.

	Examples with Exercises.
Week 10	**Mid-term Exam.**
Week 11	Boolean Algebra. Distributive Law. Rules of Boolean Algebra. Boolean Expression/Function. Examples with Exercises.
Week 12	De Morgan's Theorems. Examples: using Boolean Algebra techniques Learn how to Work in groups. Examples with Exercises.
Week 13	Standard Form of Boolean Expressions All Boolean expressions, regardless of their form, can be converted into two standard forms: ▪ The sum- of – products form. ▪ The product –of- sums form. Examples with Exercises.
Week 14	How to construct Full -Adder from two Half –Adders with Logic circuit Examples with Exercises.
Week 15	Exercises in general. • Work in groups
Week 16	**Preparatory week before the final Exam through test students.**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Textbook 1: M. Morris Mano.," Digital Design", Published by McGraw-Hill, 3rd edition (2004) 2. Morris Mano M, "Digital Logic and Computer Design", Prentice Hall, New Delhi (2006). 3. Alan B. Marcovitz - Introduction to Logic Design, 3rd Edition -McGraw-Hill (2009). 4. Charles H. Roth Jr., Larry L Kinney - Fundamentals of Logic Design, 6th Edition-CL Engineering (2009).	No

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
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	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Bioinformatics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS109**				
ECTS Credits	**7**				
SWL (hr/sem)	175				
Module Level		1	**Semester of Delivery**		2
Administering Department		IMS	**College**		CSIS
Module Leader	Dr. Labeed Abdullah Najim Al-Saad				Labeed.najim@uobasrah.edu.iq
Module Leader's Acad. Title		Assist Proff	**Module Leader's Qualification**		PhD
Module Tutor			**e-mail**		E-mail
Peer Reviewer Name			**e-mail**		E-mail
Scientific Committee Approval Date			**Version Number**		2.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of this module is to provide students with the skills, knowledge, and practical experience to leverage computational tools and techniques for analyzing biological data and advancing biological research. The objectives: 1. Understanding Biological Data. 2. Developing Computational Skills. 3. Introduction to Bioinformatics Tools and Databases. 4. Sequence Analysis: Teach students how to analyze and interpret DNA and protein sequences.. 5. Structural Bioinformatics: Introduce students to the analysis and prediction of protein structures. 6. Genomic Data Analysis: Provide students with the skills to analyze and interpret high-throughput genomic data, such as next-generation sequencing data and microarray data. 7. Systems Biology and Network Analysis: Teach students how to analyze biological systems at a network level. 8. Data Integration and Visualization.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Equip students with the necessary computational and programming skills to manipulate, analyze, and interpret biological data. This includes proficiency in programming languages (such as Python or R), statistical analysis, data visualization, and database querying.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Introduction to Bioinformatics: • Overview of bioinformatics and its applications • Introduction to biological data types and databases • Introduction to programming languages and tools used in bioinformatics (Python, R, and command-line tools) Sequence Analysis: • Introduction to DNA, RNA, and protein sequences • Sequence alignment algorithms and applications • Database searching and sequence retrieval (BLAST) • Motif discovery and prediction Structural Bioinformatics: • Protein structure prediction methods • Protein structure databases and visualization tools • Structure alignment and comparison • Protein function prediction Genomic Data Analysis: • Introduction to genomics and high-throughput sequencing technologies • Preprocessing and quality control of sequencing data • Genome assembly and annotation • Variant calling and analysis Gene Expression Analysis: • Introduction to transcriptomics and microarray data

	• Preprocessing and normalization of gene expression data • Differential gene expression analysis • Functional enrichment analysis Systems Biology and Network Analysis: • Biological network representation and analysis • Pathway analysis and gene set enrichment analysis • Introduction to systems biology and modeling approaches Data Integration and Visualization: • Data integration from multiple sources • Data mining and feature selection techniques • Data visualization methods for biological data Next-Generation Sequencing (NGS) Data Analysis: • Introduction to NGS data analysis pipelines • ChIP-seq analysis for studying protein-DNA interactions • RNA-seq analysis for gene expression quantification and isoform discovery Metagenomics and Comparative Genomics: • Introduction to metagenomics and analysis of microbial communities • Comparative genomics and evolutionary analysis • Phylogenetic analysis and tree construction Ethical and Legal Considerations in Bioinformatics: • Data privacy and security in bioinformatics research • Intellectual property rights and data sharing policies Project Work: Students will work on bioinformatics projects, applying the concepts and tools learned throughout the course. Projects can include data analysis, algorithm implementation, or research-based investigations.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Blended Learning Approach: Incorporate a mix of instructional methods, including lectures, hands-on practical sessions, group discussions, and online resources. This approach provides a balance between theoretical knowledge and practical application, catering to different learning styles. 2. Project-Based Learning: Integrate project-based learning activities where students can apply bioinformatics techniques to real-world problems. This hands-on approach fosters critical thinking, problem-solving skills, and encourages active participation. 3. Collaborative Learning: Encourage collaboration and teamwork among students by incorporating group projects, discussions, and peer-to-peer learning activities. This allows for the exchange of ideas, sharing of knowledge, and the development of interpersonal and communication skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #2-#8
	Assignments				
	Projects / Lab.	1	10% (10)	Continuous	LO #1- #8 and #10
	Report	1	10% (10)	13	LO #1- #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to bioinformatics and its applications
Week 2	Genomic Data Analysis_part 1
Week 3	Genomic Data Analysis_part 2
Week 4	Sequence analysis_Part1
Week 5	Sequence analysis_Part2
Week 6	Structural Bioinformatics_Part1
Week 7	Structural Bioinformatics_Part2
Week 8	Midterm examination

Week 9	Gene Expression Analysis 1
Week 10	Gene Expression Analysis 2
Week 11	Systems Biology and Network Analysis
Week 12	Next-Generation Sequencing (NGS) Data Analysis
Week 13	Ethical and Legal Considerations in Bioinformatics
Week 14	Project work
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	R basics – Introduction, installation, GUI
Week 2	R basics – Variables, basic commands
Week 3	R basics – R packages, download, installation, employment
Week 4	Sequence processing (Using R)
Week 5	**Basic Local Alignment Search Tool** (**BLAST**) Part1
Week 6	**Basic Local Alignment Search Tool** (**BLAST**) Part2.
Week 7	**Multible sequence Alignment (Using R)**
Week 8	Lab4: Phylogenetic analysis part1
Week 9	Lab5: Phylogenetic analysis part2
Week 10	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Textbook: "Bioinformatics: Sequence and Genome Analysis" by David W. Mount	Yes
Recommended Texts		Yes
Websites	Online resources: NCBI, Ensembl, UniProt, BLAST, ClustalW, MEGA, R, Python, and other bioinformatics tools and databases	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Anatomy**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS110**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level			**Semester of Delivery**	2	
Administering Department	IMS		**College**	CSIT	
Module Leader	Firas Jabbar Taresh		**e-mail**	Firas.j.taresh@stu.edu.iq	
Module Leader's Acad. Title	Assit .Lec		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	objectives of a human Anatomy course include: - To introduce students to the components and structures of the human body at the level of gross and microscopic anatomy. - To provide students with an understanding of the functional characteristics of human life and the four requirements for human survival. - To teach students the six levels of organization of the human body and the structure of the body from simplest to most complex. - To help students distinguish between anatomy and physiology and identify several branches of each. - To explain the importance of homeostasis to normal human functioning. - To introduce students to the relevance of anatomy to numerous aspects of their future professional practice. - To provide students with the knowledge and skills necessary to identify anatomical structures and understand physiological processes. - To teach students how to make healthful choices and prompt them to take appropriate action when signs of illness arise. - To prepare students for careers in the health professions that require an understanding of anatomy and physiology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Distinguish between anatomy and physiology and identify several branches of each. - Describe the structure of the body, from simplest to most complex, in terms of the six levels of organization. - Identify the functional characteristics of human life and the four requirements for human survival. - Define homeostasis and explain its importance to normal human functioning. - Identify the components and structures of the human body at the level of gross and microscopic anatomy. - Identify anatomical structures and understand physiological processes. - Understand the relevance of anatomy to numerous aspects of future professional practice, such as diagnosis, physical examination, record keeping, and writing letters. - Make healthful choices and take appropriate action when signs of illness arise. Prepare for careers in the health professions that require an understanding of anatomy and physiology.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: - Introduction to anatomy: - Definition of anatomy and physiology - Overview of the human body and its organization - Levels of organization in the human body - Anatomical terminology and directional terms

	Body planes and sections Body cavities and membranes Histology: study of tissues Integumentary system: skin, hair, and nails Skeletal system: Overview of the skeletal system Types of bones: long, short, flat, and irregular Bone structure: periosteum, compact bone, spongy bone, and bone marrow Bone cells: osteoblasts, osteocytes, and osteoclasts Bone growth and development: intramembranous and endochondral ossification Bone remodeling and repair Joints: types and functions Axial skeleton: skull, vertebral column, and thoracic cage Appendicular skeleton: upper and lower limbs, pectoral and pelvic girdles Skeletal system and movement: muscles, tendons, and ligaments Skeletal system and protection: skull, rib cage, and vertebral column Muscular system: Overview of the muscular system Types of muscle tissue: skeletal, smooth, and cardiac Structure and function of skeletal muscle fibers Organization of skeletal muscle: fascicles, muscle fibers, myofibrils, and sarcomeres Sliding filament theory of muscle contraction Neuromuscular junction and muscle contraction Energy metabolism in muscle cells Muscle fiber types and their characteristics Muscles of the head and neck Muscles of the trunk and limbs Muscle actions and their effects on movement Nervous system: Overview of the nervous system Neurons: structure and function Glial cells: structure and function Nerve impulses and action potentials Synaptic transmission and neurotransmitters Central nervous system: brain and spinal cord Peripheral nervous system: cranial and spinal nerves Autonomic nervous system: sympathetic and parasympathetic divisions Sensory systems: somatic and special senses

	▯ Motor systems: somatic and autonomic ▯ Endocrine system: ▯ Overview of the endocrine system ▯ Endocrine glands and their functions ▯ Hormones and their chemical properties ▯ Hormone synthesis, storage, and release ▯ Hormone transport and distribution ▯ Hormone receptors and signaling pathways ▯ Hypothalamus-pituitary axis and its regulation of endocrine function ▯ Thyroid gland and its hormones ▯ Parathyroid gland and its hormone ▯ Adrenal gland and its hormones ▯ Pancreas and its hormones ▯ Gonads and their hormones ▯ Endocrine system and homeostasis ▯ Cardiovascular system: ▯ Overview of the cardiovascular system ▯ Structure and function of the heart ▯ Blood vessels: arteries, veins, and capillaries ▯ Blood flow and circulation ▯ Cardiac cycle and heart sounds ▯ Electrical conduction system of the heart ▯ Regulation of heart rate and blood pressure ▯ Coronary circulation and heart disease ▯ Lymphatic system and its relationship to the cardiovascular system ▯ Respiratory system: ▯ Overview of the respiratory system ▯ Upper respiratory tract: nose, pharynx, and larynx ▯ Lower respiratory tract: trachea, bronchi, bronchioles, and alveoli ▯ Mechanics of breathing: inspiration and expiration ▯ Pulmonary circulation and gas exchange ▯ Control of respiration: neural and chemical regulation ▯ Digestive system: ▯ Overview of the digestive system ▯ Organs of the digestive system: mouth, pharynx, esophagus, stomach, small intestine, large intestine, rectum, and anus ▯ Tissue layers of the digestive system: mucosa, submucosa, muscularis externa, and serosa ▯ Accessory digestive organs: salivary glands, liver, gallbladder, and pancreas ▯ Digestive processes: ingestion, propulsion, mechanical and chemical

	digestion, absorption, and defecation Regulation of digestive processes: neural and hormonal mechanisms Urinary system: Overview of the urinary system Kidneys: structure and function Nephrons: structure and function Urine formation: filtration, reabsorption, and secretion Ureters: structure and function Bladder: structure and function Urethra: structure and function Micturition reflex: neural control of urination Reproductive system: Overview of the male and female reproductive systems Male reproductive system: penis, scrotum, testes, epididymis, vas deferens, prostate, and seminal vesicles Female reproductive system: ovaries, fallopian tubes, uterus, cervix, vagina, and vulva Gametogenesis: spermatogenesis and oogenesis Hormonal regulation of the reproductive system: hypothalamus-pituitarygonadal axis Integumentary system: Overview of the integumentary system Skin layers: epidermis, dermis, and hypodermis Skin appendages: hair, nails, and glands Skin functions: protection, sensation, thermoregulation, vitamin D synthesis, and excretion Skin color and pigmentation

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Instructors can use lectures to introduce students to the basic concepts and structures of anatomy. 2. Laboratory work: Laboratory work can provide students with hands-on experience in identifying anatomical structures and understanding physiological processes. 3. Research projects: Research projects can help students deepen their understanding of specific topics in anatomy and apply their knowledge to realworld problems. 4. Problem-based learning: Problem-based learning can be used to help students develop critical thinking skills and apply their knowledge of anatomy to solve clinical problems.

	5. Clinical orientation: Anatomy instruction can be made more effective by providing context for students. 6. Learning objectives: Instructors can use learning objectives to guide students in their learning and help them focus on the most important concepts and structures of anatomy. 7. Assessment activities: Assessment activities, such as exams, quizzes, and research papers, can be used to measure student learning outcomes and provide feedback to students on their progress.

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدرا يس المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدرا يس المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدرا يس غ ري المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدرا يس غ ري المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدرا يس الك يل للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10 % (10)	5 and 10	LO #5, #9
	Assignments	1	10 % (10)	1	LO #1-#6
	Projects / Lab.	1	10 % (10)	1	
	Report				
Summative assessment	**Midterm Exam**	2 hr	10 % (10)	1	LO #1 - #6
	Final Exam	3 hr	50 % (50)	1	All
Total assessment			100% (100) Mark		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to anatomy and histology
Week 2	Skeletal system

Week 3	Muscular system
Week 4	Nervous system
Week 5	Endocrine system
Week 6	Cardiovascular system
Week 7	Midterm exam
Week 8	Respiratory system
Week 9	Digestive system
Week 10	Urinary system
Week 11	Reproductive system
Week 12	Integumentary system: skin, hair, and nails
Week 13	Integration of physiological systems part 1
Week 14	Integration of physiological systems part 2
Week 15	Review to prepare for final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Anatomy and Physiology - Overview of the human body and its organization - Six levels of organization - Functional characteristics of human life - Four requirements for human survival - Homeostasis and its importance
Week 2	Skeletal System - Types of bones and their functions - Bone structure and cells - Bone growth and development - Joints and their types
Week 3	Muscular System - Types of muscle tissue

	▯ Muscle structure and function ▯ Sliding filament theory of muscle contraction ▯ Neuromuscular junction and muscle contraction
Week 4	Nervous System ▯ Neurons and glial cells ▯ Nerve impulses and action potentials ▯ Synaptic transmission and neurotransmitters ▯ Central and peripheral nervous systems
Week 5	Endocrine System ▯ Endocrine glands and their functions ▯ Hormones and their chemical properties ▯ Hypothalamus-pituitary axis and its regulation of endocrine function
Week 6	Cardiovascular System ▯ Structure and function of the heart ▯ Blood vessels and circulation ▯ Cardiac cycle and heart sounds ▯ Regulation of heart rate and blood pressure
Week 7	Respiratory System ▯ Upper and lower respiratory tracts ▯ Mechanics of breathing ▯ Pulmonary circulation and gas exchange ▯ Control of respiration
Week 8	Digestive System ▯ Organs of the digestive system and their functions ▯ Tissue layers of the digestive system ▯ Digestive processes and regulation
Week 9	Urinary System ▯ Kidneys and nephrons ▯ Urine formation and transport ▯ Micturition reflex and neural control of urination
Week 10	Reproductive System ▯ Male and female reproductive systems ▯ Gametogenesis and hormonal regulation

	▯ Menstrual cycle and fertilization ▯ Pregnancy and embryonic development
Week 11	Integumentary System ▯ Skin layers and appendages ▯ Skin functions and color ▯ Wound healing and scar formation
Week 12	Laboratory Work ▯ Dissection of anatomical models or cadavers ▯ Identification of anatomical structures
Week 13	Laboratory Work ▯ Observation of physiological processes ▯ Data collection and analysis
Week 14	Review
Week 15	Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Textbook: "Human Anatomy" by Frederic H. Martini, Michael J.Timmons, and Robert B. Tallitsch	Yes
Recommended Texts		
Websites	Online resources: Khan Academy, YouTube, and other educational websites	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Physiology**			**Module Delivery**	
Module Type	**core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS111**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	IMS		**College**	CSIS	
Module Leader	Assist. Prof Dr. Sundus Waleed Khalid		**e-mail**	Sundus.khalid@uobasrah.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	**1.0**	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims أ	objectives of a human physiology course include: • To provide students with an understanding of how the human body works • To introduce students to the function, regulation, and integration of human body organ systems • To build on knowledge of basic physiological principles and provide a course of study in mammalian, principally human, systems physiology. • To prepare students for health sciences programs, including medicine, physician assistant, nursing, chiropractic, and other medical-related fields. • To identify different human system. • To demonstrate blood percentage and blood pressure . • To know how to count precise number of white and red blood cells in human .
Module Learning Outcomes	• Robust understanding of human anatomy and human physiology. • Enhanced knowledge and appreciation of mammalian physiology. • Understanding of the functions of important physiological systems. • The ability to apply physiological concepts to real-life situations. • Development of critical thinking and problem-solving skills. Development of communication skills, including the ability to communicate scientific concepts effectively. • To do different laboratory analysis in human an blood
Indicative Contents	Indicative content includes the following: • Overview of Human Physiology: Importance of Human Physiology, Key Concepts in Human Physiology, Approaches to Studying Human Physiology, Interdisciplinary Nature of Human Physiology. • Training the student to use different apparatus in the laboratory and develop research capacities to the students.

Learning and Teaching Strategies	
Strategies	1. Provide a foundation of physiological principles. 2. Use active learning strategies: Active learning strategies have been shown to increase both academic performance and student engagement. 3. Use assessment activities: Assessment activities in the physiology undergraduate program must take class size into consideration. 4. The course should cover the physiology of the entire human body thoroughly.

	The course should provide practical applications of physiological principles to real-life situations. 5-Explanation and Discussion of the Lectures 6. boosting the student to make reports, and power point presentation

Student Workload (SWL)

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #5, #9
	Assignments	1	10%(10)	Continuous	All
	Projects / Lab.				
	Report	1	10%(10)		
Summative assessment	**Midterm Exam**	2hr	20% (20)	7	LO #1 - #6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction: cells and tissue.
Week 2	Cell physiology.

Week 3	Circulatory system
Week 4	Urinary system.
Week 5	exam
Week 6	Respiratory system.
Week 7	Endocrine system.
Week 8	Hematology (anemia types)
Week 9	Polycythemia and jaundice
Week 10	Diabetes mellitus
Week 11	**Preparatory week before the final Exam**
Week 12	
Week 13	
Week 14	
Week 15	

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Draw blood method , source and tools used in lab.
Week 2	Measurement of red blood cell and white blood cell count
Week 3	Measurement of hemoglobin
Week 4	Packed cell volume
Week 5	Erythrocyte sedimentation rate
Week 6	Blood group
Week 7	Blood pressure
Week 8	Sickle cell anemia test
Week 9	Bleeding and clotting time

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Human physiology ,Animal physiology , hematology - Endocrinology	yes
Recommended Texts	Animal physiology and endocrine glands , Cyton Book of physiology	yes
Websites	http://wilkibooks. www.Jairr.com www.damastagate.com	

Grading Scheme				
Group	**Grade**		**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent		90 - 100	Outstanding Performance
	B - Very Good		80 - 89	Above average with some errors
	C - Good		70 - 79	Sound work with notable errors
	D - Satisfactory		60 - 69	Fair but with major shortcomings
	E - Sufficient		50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail		(45-49)	More work required but credit awarded
	F – Fail		(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of Health informatics**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS112**				
ECTS Credits	**4**				
SWL (hr/sem)	100				
Module Level		1	**Semester of Delivery**		2
Administering Department		IMS	**College**		CSIT
Module Leader	Garinrh S. Ohannesian				garineh.sarkies@uobasrah.edu.iq
Module Leader's Acad. Title		Asst. Lecturer	**Module Leader's Qualification**		MSc
Module Tutor			**e-mail**		E-mail
Peer Reviewer Name			**e-mail**		E-mail
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives **أهداف المادة الدراسية**	1. Define Health Informatics: Understand the scope and significance of health informatics in healthcare delivery, management, and research. 2. Explain Health Information Systems: Comprehend the types of health information systems, including electronic health records (EHRs), health information exchanges (HIEs), and telemedicine platforms. 3. Manage Health Data: Understand the principles of health data management, including data collection, storage, and data quality assurance in healthcare settings. 4. Utilize Health Data Standards and Terminologies: Familiarize themselves with health data standards, coding systems, and terminologies commonly used in healthcare to ensure interoperability and consistency. 5. Address Health Information Privacy and Security: Identify the ethical, legal, and security considerations involved in handling and safeguarding health information and patient privacy. 6. Apply Healthcare Analytics and Decision Support: Learn how health informatics can be used to analyze healthcare data, generate insights, and support clinical decision-making. 7. Explore Telemedicine and Mobile Health: Understand the role of telemedicine and mobile health technologies in delivering remote healthcare services and engaging patients. 8. Integrate Health Informatics with Public Health: Recognize the application of health informatics in public health surveillance, disease prevention, and health promotion. 9. Engage Patients using Health Informatics: Understand patient engagement strategies through health informatics tools, including patient portals and online health services. 10. Comprehend Health Informatics in Clinical Research: Appreciate the significance of health informatics in clinical research, evidence-based practice, and clinical trials. 11. Improve Healthcare Quality with Health Informatics: Recognize how health informatics can enhance healthcare quality, patient safety, and outcomes. 12. Explore Emerging Trends in Health Informatics: Stay updated on the latest technological advancements, such as artificial intelligence (AI) and blockchain, and their potential impact on healthcare. 13. Address Ethical and Social Implications: Understand the ethical considerations and social implications related to health informatics practices, including equity, access, and social justice issues.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Understand Health Informatics Concepts: Demonstrate a clear understanding of the fundamental concepts, principles, and terminologies in health informatics. 2. Apply Health Information Systems: Utilize knowledge of health information systems to manage patient data, facilitate information exchange, and improve healthcare workflow. 3. Analyze Health Data: Effectively analyze and interpret health data using appropriate statistical and analytical methods. 4. Implement Health Data Standards: Apply health data standards and

	terminologies to ensure accurate, consistent, and interoperable health data exchange. 5. Address Privacy and Security Concerns: Recognize and address ethical, legal, and security issues related to health information privacy and data security. 6. Employ Healthcare Analytics: Utilize healthcare analytics tools and techniques to extract meaningful insights from health data for informed decision-making. 7. Utilize Telemedicine and Mobile Health: Understand the applications of telemedicine and mobile health technologies to deliver remote healthcare services and enhance patient engagement. 8. Integrate Health Informatics with Public Health: Apply health informatics to support public health initiatives, surveillance, and disease prevention efforts. 9. Enhance Patient Engagement: Implement strategies for engaging patients through health informatics tools, fostering a patient-centered approach to healthcare. 10. Explore Health Informatics in Clinical Research: Evaluate the role of health informatics in clinical research, evidence-based practice, and clinical decision-making. 11. Improve Healthcare Quality: Identify opportunities to leverage health informatics to improve healthcare quality, patient safety, and outcomes. 12. Embrace Emerging Trends: Stay informed about emerging trends and technologies in health informatics, such as AI, blockchain, and virtual reality, and assess their potential impact on healthcare. 13. Address Ethical and Social Implications: Analyze the ethical considerations and social implications of health informatics practices and contribute to equitable and accessible healthcare solutions. 14. Apply Python Programming in Health Informatics: Demonstrate practical skills in using Python programming language to manipulate health data, analyze healthcare datasets, and develop health informatics applications.
Indicative Contents **المحتويات الإرشادية**	Introduction to Health Informatics • Overview of health informatics and its significance in modern healthcare • Historical evolution and key milestones in health informatics • Health informatics roles and careers Health Information Systems • Types of health information systems (HIS) • Electronic health records (EHRs) and their functionalities • Health information exchange (HIE) and interoperability Health Data Management • Principles of health data management • Health data sources, collection, and storage • Data quality and data governance in healthcare Health Data Standards and Terminologies • Importance of health data standards • Common healthcare terminologies and coding systems (e.g., SNOMED-CT, ICD, CPT) • Introduction to HL7 and DICOM standards Health Information Privacy and Security • HIPAA regulations and their impact on health information privacy • Security challenges in health informatics • Data breaches and cybersecurity in healthcare Healthcare Analytics and Decision Support

	• Introduction to healthcare analytics and its applications • Clinical decision support systems (CDSS) and their role in improving patient outcomes • Data visualization for healthcare Telemedicine and Mobile Health • Telemedicine concepts and technologies • Remote patient monitoring and wearable devices • Telehealth legal and ethical considerations Health Informatics and Public Health • Use of health informatics in public health surveillance and reporting • Population health management and disease prevention • Health information exchange for public health agencies Health Informatics for Patient Engagement • Patient portals and online health services • Patient engagement strategies using health informatics • Designing patient-centered health technologies Health Informatics and Clinical Research • Role of health informatics in clinical research and evidence-based practice • Use of big data and data analytics in clinical trials • Ethical considerations in health informatics research Health Informatics and Quality Improvement • Quality management and performance measurement in healthcare • Using health informatics to enhance healthcare quality • Health informatics in the context of value-based care Emerging Trends in Health Informatics • Artificial intelligence (AI) and machine learning in health informatics • Blockchain applications in healthcare • Virtual and augmented reality in medical education and patient care Ethical and Social Implications of Health Informatics • Ethical considerations in health informatics practices • Equity, access, and social justice issues in health informatics • Future directions and challenges in health informatics

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
	1. Lectures and Presentations: Provide comprehensive lectures and presentations to introduce key concepts, theories, and technological elements of health informatics 2. Case Studies and Real-World Examples: Use case studies and real-world examples to illustrate the application of health informatics principles in healthcare settings. This helps students understand how health information systems are designed and used 3. Hands-on Activities and Projects: Engage students in hands-on activities and projects that allow them to apply their knowledge and skills in practical scenarios. This could include designing a mock electronic health record system or analyzing health data 4. Group Discussions and Debates: Encourage group discussions and debates to foster critical thinking and collaboration among students. This can be done by

	assigning topics related to health informatics for students to research and present their findings 5. Guest Speakers and Industry Experts: Invite guest speakers and industry experts to share their experiences and insights in the field of health informatics. This provides students with a broader perspective and exposes them to real-world challenges and opportunities 6. Online Resources and Learning Platforms: Utilize online resources and learning platforms to supplement classroom instruction. This could include online modules, videos, interactive quizzes, and discussion forums 7. Assessment Methods: Use a variety of assessment methods such as quizzes, exams, projects, and presentations to evaluate students' understanding and application of health informatics concepts 8. Continuous Feedback and Support: Provide continuous feedback and support to students throughout the module. This can be done through regular office hours, online communication channels, and timely grading of assignments

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	49	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #2-#8
	Assignments				
	Projects / Lab	1	10% (10)	Continuous	LO #1- #8 and #10
	Report	1	10% (10)	13	LO #1- #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Health Informatics
Week 2	Health Information Systems
Week 3	Health Data Management
Week 4	Health Data Standards and Terminologies
Week 5	Health Information Privacy and Security
Week 6	Midterm examination
Week 7	Healthcare Analytics and Decision Support
Week 8	Telemedicine and Mobile Health
Week 9	Health Informatics and Public Health
Week 10	Health Informatics for Patient Engagement
Week 11	Health Informatics and Clinical Research
Week 12	Health Informatics and Quality Improvement
Week 13	Emerging Trends in Health Informatics
Week 14	Ethical and Social Implications of Health Informatics
Week 15	**Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Python and Healthcare Data • Setting up Python environment and IDEs • Basic Python syntax and data structures • Reading and writing healthcare data (e.g., CSV, JSON)
Week 2	Data Manipulation and Cleaning • Data preprocessing techniques for health datasets • Handling missing data and data imputation • Data transformation and feature engineering
Week 3	Exploratory Data Analysis in Healthcare • Descriptive statistics and data visualization for healthcare data • Identifying trends and patterns in health datasets

	• Plotting health-related graphs (e.g., histograms, box plots)
Week 4	Introduction to Pandas for Healthcare Data • Understanding Pandas data frames and series • Data filtering, sorting, and grouping in health datasets • Combining and merging healthcare data
Week 5	Healthcare Data Visualization with Matplotlib and Seaborn • Creating visualizations for health informatics datasets • Customizing plots and charts for healthcare data • Presenting health-related insights through visualizations
Week 6	Midterm exam
Week 7	Introduction to Numpy for Health Data Analysis • Numerical computing with Numpy in Python • Basic mathematical operations on health data arrays • Applying Numpy for statistical analysis
Week 8	Health Data Analysis with Scipy • Introduction to Scipy libraries for scientific computing • Performing statistical tests on healthcare data • Applying Scipy for health research studies
Week 9	Introduction to Machine Learning in Health Informatics • Basics of supervised and unsupervised machine learning • Preparing health data for machine learning tasks • Implementing simple machine learning algorithms using Scikit-learn
Week 10	Machine Learning for Healthcare Predictive Analytics • Training and evaluating healthcare prediction models • Model evaluation metrics for health informatics applications • Handling imbalanced health datasets in machine learning
Week 11	ext Mining in Health Informatics • Processing healthcare text data using Python • Natural Language Processing (NLP) for clinical notes • Building simple text classifiers for health-related text
Week 12	Healthcare Data Visualization with Plotly • Interactive and dynamic data visualizations for healthcare • Building interactive healthcare dashboards • Presenting health insights through web-based visualizations
Week 13	Health Informatics Project Development

	• Students work on a health informatics project using Python • Implementing a real-world health informatics application • Presenting and demonstrating their projects to the class
Week 14	Final Project Presentations and Wrap-Up • Students present their final projects to the class • Review of key concepts and takeaways from the lab • Discussion of potential future applications of Python in health informatics
Week 15	Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Fundamentals of Health Information Management** by Melanie S. Brodnik, Mary A. Johnson, and Karyn P. Lee	Yes
Recommended Texts	**Guide to Health Informatics** by Enrico Coiera. **Health Informatics: An Interprofessional Approach** by Ramona Nelson and Nancy Staggers. **Health Informatics: Practical Guide for Healthcare and Information Technology Professionals** by Robert E. Hoyt and Ann K. Yoshihashi	Yes
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Discrete Mathematics**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	IMS202				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	2		**Semester of Delivery**	3	
Administering Department	IMS		**College**	CSIT	
Module Leader	Alia Saad Al-Jubair		**e-mail**	alia.yaseen@uobasrah.edu.iq	
Module Leader's Acad. Title	Assistant Prof.		**Module Leader's Qualification**	Master	
Module Tutor	Alia Saad Al-Jubair		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	This course aims at teaching students how to think mathematically. Students will learn a set of mathematical facts and techniques as well as some major discrete structures that related with computers. They will also learn how to use these facts, techniques and discrete structures to design computer-based solutions for real life problems.
Module Learning Outcomes	• Developing the acquisition of some acquired skills from inflammation Everyday life. • Developing mathematical skills (skills that help form mathematical sense) skills Estimation, mental calculation, judging the reasonableness of the results, etc.). • Acquiring various methods of conducting operations. • Develop the ability to seriously classify and collect numerous data, tabulate and read them representation and interpretation.
Indicative Contents	✓ Self-learning skills ✓ Skills to work in a team ✓ Thinking skills with mathematical logic ✓ Report writing skills

Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by solving exercises..

Student Workload (SWL)			
Structured SWL (h/sem)	49	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem)	51	**Unstructured SWL (h/w)**	3.4
Total SWL (h/sem)	**100**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	20% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	0%	Continuous	All
	Report	0	0%	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	• Sets • Subsets • Operations on sets • Computer Representation of Sets
Week 2	• Cartesian product • Sequences • Properties of Integers
Week 3	• Matrices • Propositional and Logical Operations • Conditional Statements
Week 4	• Conditional Statements • Mathematical Induction • Product sets and Partitions
Week 5	• Methods of Proving Theorems • Recursive • Relations
Week 6	• Properties of Relations • Operations Relations • Computer Representation of Relations
Week 7	• Properties of Relations • Equivalence Relations • Computer Representation of Relations and Digraphs • Operations and Relations
Week 8	• Functions • Functions for Computer Science • Domain and codomain of the function

Week 9	• Range of the function • Graph of function • • Functions types
Week 10	• Permutation Functions • Graph • The types of graphs
Week 11	• Some Special Simple Graphs • Representing Graphs • Isomorphism and Isomorphic of graphs
Week 12	• Common graphs • Some important concepts
Week 13	• Kinds of graphs • More graphs
Week 14	• Trees • Labeled Trees
Week 15	• Tree Searching • Undirected Trees
Week 16	• Tree Traversal • Traversal Algorithms • Infix, Prefix, and Postfix Notation

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Foundations of Mathematical theory of structures, E.R. De Arantes e blveira.	Yes
Recommended Texts	Mathematical modeling of the process of nonlinear deformation of DOAJ	No
Websites		

Grading Scheme

Group	Grade	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	90 - 100	Outstanding Performance
	B - Very Good	80 - 89	Above average with some errors
	C - Good	70 - 79	Sound work with notable errors
	D - Satisfactory	60 - 69	Fair but with major shortcomings
	E - Sufficient	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	(45-49)	More work required but credit awarded
	F – Fail	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM / 2024-2025

Module Information					
Module Title	**Object Oriented Programming**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS203**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	IMS		**College**	CSIT	
Module Leader	Rana M. Ghadban		**e-mail**	rana.ghadban@uobasrah.edu.iq	
Module Leader's Acad. Title	Asst. Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	2.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	Introduce the concepts of object-oriented programming in a higher level programming language, such Java 2. Analyze a problem statement to design a model of objects necessary to

	create software architecture. 3. Gain skills in designing, and programming software for reuse of code. 4. Establish development methods in object-oriented programming to qualify students for teaching the language in other settings.
Module Learning Outcomes	1. Identify what mean of object-oriented programming and structural programming. 2. Learn the basic of java programming language: structure, data type, input and output statement. 3. Identify on control statements and define arrays and how to access to elements 4. Identify on how to write method and call it in java. 5. Understand and practical mastery of object-oriented concepts such as classes, objects. 6. Identify on access modifies 7. Identify on data abstraction, methods overriding, method overloading. 8. Understand inheritance concept, types and how implements of it. 9. Understanding polymorphism concept, types. 10. Understanding Encapsulation concept.
Indicative Contents	• Introduction to OOP • java basics • Classes, objects • constructors Strings • Inheritance concept • this and supper • overloading and overriding • Access modifiers • Polymorphism concept • Encapsulation concept

Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in this module through a series of lectures the theoretical underpinnings of meaning of object oriented programming language (such as java) and it concepts. This will be achieved through of theoretical lectures in classes and projects in lab, there are many assignments that increase the activities and understanding of students: 1. There are a number of quizzes that assess the student's competency in end of each topic. 2. There is a midterm class test. 3. There are take-home mini-projects by a team of 2 students. 4. There are end-of-semester exam test.

Student Workload (SWL)			
Structured SWL (h/sem)	**79**	**Structured SWL (h/w)**	**5**
Unstructured SWL (h/sem)	**96**	**Unstructured SWL (h/w)**	**6.4**
Total SWL (h/sem)	**175**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4 and 8	LO #2- #5
	Assignments	2	10% (10)	6 and 10	LO #7- #9
	Projects / Lab.	2	20% (20)	14	LO #2- #14
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	1hr	10% (10)	8	LO #1- #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Introduction: What is Object-oriented programming (OOP), what is the structure of object oriented programming? What are the main concepts of OOP? What are the benefits of OOP? Program template for Java programs, identifier, basic data types, variables and constant.
Week 2	Class Declaration Creation Constructors overloading Constructor
Week 3	Exercises in Classes
Week 4	variable types, this keyword and method overloading and type Promotion(casting)
Week 5	Inheritance, definition, types, super keyword
Week 6	Exercises in Inheritance
Week 7	Method Overriding and access modifiers
Week 8	Mid-term Exam

Week 9	Encapsulation concept
Week 10	Polymorphism , definition, types
Week 11	Exercises in polymorphism and Encapsulation
Week 12	Abstraction: abstract class
Week 13	Exercises in abstraction
Week 14	interface concept, implement and extends with interface
Week 15	Exercises in interface
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: java and NetBeans
Week 2	Lab 2 : training in Arrays
Week 3	Lab 3 : training with overloading method
Week 4	Lab 4 : classes and object
Week 5	1st Quiz
Week 6	Lab 6: training in classes and constructor
Week 7	Lab 7: training with access modifier
Week 8	Lab 8: training in inheritance
Week 9	Lab 9: training with super keyword
Week 10	Lab 10: training with overridden method
Week 11	2nd Quiz
Week 12	Lab 10: training with abstract class
Week 13	Lab 11: training with interface
Week 14	Lab 12: training in all OOP Concepts

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	A. A. Puntambekar. (2020). Object oriented programming,	No
Recommended Texts	[1] C. Thomas Wu (2010). An Introduction to Object-Oriented Programming with Java. Fifth Edition. McGraw-Hill.	No

	[2] Herbert Schildt (2007). Java: The Complete Reference. Seventh Edition. McGraw-Hill.	
Websites	https://www.google.iq/books/edition/Object_Oriented_Programming/WKUbEAAAQBAJ?hl= en&gbpv=1&dq=object+oriented+programming+java&printsec=frontcover	

Grading Scheme				
Group	**Grade**		**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent		90 - 100	Outstanding Performance
	B - Very Good		80 - 89	Above average with some errors
	C - Good		70 - 79	Sound work with notable errors
	D - Satisfactory		60 - 69	Fair but with major shortcomings
	E - Sufficient		50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail		(45-49)	More work required but credit awarded
	F – Fail		(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**System Analysis and Design**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	IMS205				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	IMS		**College**	CSIT	
Module Leader	Dr. Mustafa Moosa Qasim		**e-mail**	mustafa_mq87@uobasrah.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	2.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	

Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This module aims to provide students in the Department of Intelligent Medical Systems with a comprehensive understanding of the principles, methods, and practices of systems analysis and design. It introduces the complete system development process through an end-to-end explanation, beginning with requirements analysis and proceeding to system design, with emphasis on system architecture, user interfaces, and system integration. The objectives of this module include the following: 1. Equip students with theoretical knowledge and practical skills in analyzing, modeling, and designing information systems. 2. Enable students to gather and interpret requirements, design system components and environments, and develop both general and detailed models to support system implementation. 3. Provide students with experience in managing system development projects, including planning, coordination, and control. 4. Develop an understanding of how to analyze and design system databases in relation to user interfaces for data input and output, as well as implement controls to protect the system and its data 5. Foster an understanding of contemporary approaches and methodologies for developing modern information systems. 6. Develop students' ability to integrate technical and managerial perspectives to address real-world system development challenges.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamental concepts and terms of system analysis and system design. 2. Describe different lifecycle models and explain the various stages in systems development. 3. Discuss various approaches to systems analysis and design and explain their strengths and weaknesses. 4. Discover and understand the details of the problem or the need and define the main criteria to obtain approval to proceed. 5. understand how to plan and monitor the project by using scheduling techniques (Break down structure and Gantt chart) 6. introducing to system analysis process, discover Systems Analysis Tools & Techniques.

	7. Explain information gathering techniques (interview, questionnaire) 8. Define two types of requirements (functional and non-functional) 9. Model system functionality using UML activity, use case and sequence diagrams 10. Model an overall system using UML class diagrams. 11. Understand the design of the various new system components such as deployment environment, the application architecture and software, and the database. 12. discuss the principles of user interface design and explain the main factors influencing usability of software systems
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Overview</u> What is system analysis What is system design The role of system analyst in software development <u>System development approaches</u> Phases of system development life cycle (SDLC) Predictive approach Waterfall model as an example of predictive <u>System development approaches</u> Adaptive approach Spiral model Incremental model Walking skeleton model <u>Software development lifecycle- phases-1</u> Identify the problem Quantify project approval factors. Perform risk and feasibility analysis. Review with the client and obtain approval <u>Software development lifecycle: phases-2: planning</u> Schedule the work using breakdown structure Schedule the work using Gantt chart Evaluate work processes. Monitor progress and make corrections <u>Software development lifecycle- phases-3: analysis</u> Gather detailed information using interview and questionnaire Define requirements (functional and non-functional) Prioritize requirements Develop user-interface dialogs (story board and prototype) Evaluate requirements with users

	Software development lifecycle: phases-3: analysis • Purpose and notation of activity diagrams • Use cases, Actors, Use case diagram • Mapping a UML class model, associations, inheritance • UML interaction diagrams: Messages, Elements of a Sequence Diagram • Software development lifecycle: phases-4: Design • Design the environment. • Design application architecture and software. • Design user interfaces. • Design system interfaces. • Design the database. • Design system controls and security Software development lifecycle: phases-4: Design • Describe usability issues. • Main rules of user interface design

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module is delivered through a series of lectures that introduce and explain the theoretical foundations of software systems analysis and design. Assessment is structured into four main components: weekly quizzes that evaluate students' competency in specific topics, a midterm test to measure progress at the midpoint of the semester, two take-home assignments along with a seminar presentation and written report to develop applied and communication skills, and a final examination at the end of the semester to assess students' overall understanding of the theoretical material.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 - 10	#1، #3، #7 و #8
	Assignments	2	10% (10)	2 - 12	#3، #4، #6 ، و #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	#5, #8 and #10
Summative assessment	Midterm Exam	1hr	10% (10)	10	#1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Overview definition of several terms such as system analysis, system design, and the role of the system analyst in software development.
Week 2	System Development Approaches.
Week 3	System Development Approaches.
Week 4	Software development lifecycle (SDLC): all six/seven phases
Week 5	Software development lifecycle (SDLC): phase1: identify the problem
Week 6	Software development lifecycle (SDLC): phase2: project planning

Week 7	Software development lifecycle (SDLC): phase3: Analysis activities
Week 8	Systems Analysis Activities: system requirements gathering and defining
Week 9	Systems Analysis Activities: UML Modeling (Activity diagram)
Week 10	**Mid-semester exam.**
Week 11	Systems Analysis Activities: UML Modeling (use case diagram)
Week 12	Systems Analysis Activities: UML Modeling (class diagram)
Week 13	Systems Analysis Activities: UML Modeling (Sequence diagram)
Week 14	Systems Design Activities: User Interface Design
Week 15	Review and Exam Preparation: review of key topics and concepts, exam practice, and preparation.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	J. W. Satzinger, R. B. Jackson and S. D. Burd. *Systems Analysis and Design in a Changing World*, 7th ed. Boston, USA: Thomson Course Technology, 2015. (ISBN- 10: 1305117204 ISBN-13: 978-1305117204)	No
Recommended Texts	Unhelkar, B. Software Engineering with UML, 2017. Boca Raton: Taylor & Francis, ISBN: 9781351235181.	No
Websites	https://www.udemy.com/course/system-analysis-design-k/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A –** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Data Structures and Algorithms**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS206**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	IMS		**College**	CSIT	
Module Leader	Dr. Salma A. Mahmood		**e-mail**	salma.mahmood@uobasrah.edu.iq	
Module Leader's Acad. Title	assistant professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Jenan A. Abdalhasan		**e-mail**	Jenan.alkereem@uobasrah.edu.iq	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	1. To know the meaning of data structures in computer science and their classification. 2. To understand how each data structure is stored in memory. 3. To understand how access to each data structure is stored in memory. 4. To perform basic operations on each data structure. 5. To implement each data structure by using any programming language.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. It provides the means of data types and data structures. 2. Identify the classification of data structures and the main operations of them. 3. Identify arrays and discuss the features, main operations, how to access each element, and how to implement them in Python. 4. Identify how representation strings are created and how to create a string object in Python. 5. Identify linked lists and discuss the features, main operations, types, and how to implement them in Python. 6. Identify the stacks and discuss the features, main operations, Applications, including implementation in Python using arrays and linked lists. 7. Discuss how to evaluate the expression using the stack. 8. Learn how to write the implementation of a recursive function by using a stack. 9. Identify the queues and discuss the features, main operations, applications, and how to implement them in Python using arrays and linked lists.
Indicative Contents **المحتويات الإرشادية**	• Introduction to Data Structures • Classification of Dasta Structures • Arrays • Strings • Linked lists • Stacks • Application of Stack • Recursion • Queues

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in this module is through a series of lectures on the theoretical underpinnings of how the data is organized in memory and how it is implemented by using one of the programming languages, such as Python. This will be achieved through, instead of theoretical lectures in classes and projects in the lab, many assignments increase the activities and understanding of students: 1. Several quizzes assess the student's competency at the end of each topic. 2. There is a midterm class test. 3. There are take-home mini-projects by a team of 2 students. 4. There is an end-of-semester exam.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4 and 8	LO #3- #5 and #7
	Assignments	2	10% (10)	6 and 10	LO #8, #9
	Projects / Lab.	1	20% (20)	14	LO #3- #9
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #6
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Types of Data Types, Types of Data Structures
Week 2	Arrays DS: definition, features, logic, physical structure, and access equations of a one-dimensional array.
Week 3	Arrays DS: logic, physical structure, and access equations of two-dimensional arrays.
Week 4	Arrays DS: logic, physical structure, access equation of three and multi-dimensional arrays, and triangle arrays.
Week 5	Strings DS: definition, basic representations in memory, and creating a string object.
Week 6	Stack DS: definition, features, implementation using lists and arrays
Week 7	Stack DS: application uses a list and arrays
Week 8	Mid-term Exam

Week 9	Queue DS: definition, features, implementation using lists and Arrays
Week 10	Queue DS: application uses a list and an array
Week 11	Queue DS: types of queues
Week 12	Object-Oriented Programming (OOP) definition, Classes and Objects, Encapsulation, Inheritance, Polymorphism
Week 13	Linked Lists DS: definition, advantages and disadvantages of arrays and linked lists, basic operations of linked lists, types of linked lists.
Week 14	Stack and queue implementation using linked lists
Week 15	Implementation of linked lists using OOP

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Arrays in the Python language
Week 2	Tasks in arrays using the Python language
Week 3	String methods in the Python language
Week 4	Tasks in Strings using Python language
Week 5	Stack in Python language
Week 6	Stack to evaluate expression
Week 7	Queues in Python language
Week 8	Queues to evaluate expression
Week 9	OOP in Python languages
Week 10	Linked Lists in Python language
Week 11	Tasks in linked lists (single and circular linked lists)
Week 12	Tasks in linked lists (double and Circular Double Linked Lists)
Week 13	Implement a stack and a queue using linked lists in Python
Week 14	Implementation of linked lists using OOP in Python
Week 15	Final project presentation

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Python Data Structures and Algorithms, Benjamin Baka,2017 2. A Textbook of Data Structures and Algorithms by G. A. Vijayalakshmi Pai, 2022	No
Recommended Texts	Hands-On Data Structures and Algorithms with Python by Dr. Basant Agarwal, 2022	No
Websites	https://realpython.com/python-data-structures/ GeeksforGeeks: https://www.geeksforgeeks.org/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Communication diseases**			**Module Delivery**	
Module Type	**core**			☒ **Theory** **Lecture** **Lab** **Tutorial** **Practical** **Seminar**	
Module Code	**IMS207**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	IMS		**College**	CSIS	
Module Leader	Assist. Prof Dr. Sundus Waleed Khalid		**e-mail**	Sundus.khalid@uobasrah.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	**1.0**	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims أ	• Understanding the epidemiology of communicable diseases, including their • transmission, prevention, and control measures. • .Identifying the major types of communicable diseases, such as respiratory • infectious diseases, sexually transmitted infections, vector-borne diseases, • foodborne and waterborne diseases, and zoonotic diseases. • . Understanding the impact of communicable diseases on global health, including • their burden of disease and mortality rates. • Understanding the role of public health in communicable disease prevention and • control. • . Understanding the ethical issues related to communicable disease management.
Module Learning Outcomes	• The expected outcomes of a communicable diseases module may include: • Understanding the core knowledge and skills necessary for the application of • communicable disease control activities in a variety of settings • . Identifying the major types of communicable diseases and their modes of • transmission, as well as the diseases they cause • . Understanding the natural history of communicable diseases and how • interventions at different stages could prevent or control the disease • . Understanding the impact of communicable diseases on global health and the • burden of disease and mortality rates • . Understanding the role of public health in communicable disease prevention and • control • . Understanding the ethical issues related to communicable disease management • . Developing skills in community diagnosis and identifying appropriate measures for • the prevention and control of communicable diseases
Indicative Contents	• . **Introduction to Communicable Diseases** Definition of communicable diseases Overview of the history of communicable diseases Epidemiology of communicable diseases **Transmission of Communicable Diseases** Modes of transmission Prevention and control measures Case studies of communicable disease outbreaks

	Respiratory Infectious Diseases 3 - Overview of respiratory infectious diseases - Epidemiology of respiratory infectious diseases - Prevention and control measures **Sexually Transmitted Infections** - Overview of sexually transmitted infections - Epidemiology of sexually transmitted infections - Prevention and control measures **Vector-Borne Diseases** - Overview of vector-borne diseases - Epidemiology of vector-borne diseases - Prevention and control measures **Foodborne and Waterborne Diseases** - Overview of foodborne and waterborne diseases - Epidemiology of foodborne and waterborne diseases - Prevention and control measures **Zoonotic Diseases** - Overview of zoonotic diseases - Epidemiology of zoonotic diseases - Prevention and control measures **Emerging and Re-emerging Diseases** - Overview of emerging and re-emerging diseases - Epidemiology of emerging and re-emerging diseases - Prevention and control measures **Global Health and Communicable Diseases** - Overview of global health and communicable diseases - Epidemiology of communicable diseases in low- and middle-income countries - Prevention and control measures in low- and middle-income countries **Telemedicine and Communicable Diseases** - Overview of telemedicine and its role in communicable disease management - Case studies of telemedicine in communicable disease management **Communicable Diseases and Public Health** - Overview of communicable diseases and public health - Role of public health in communicable disease prevention and control - Case studies of successful public health interventions **Communicable Diseases and Ethics** - Overview of ethical issues in communicable disease management - Case studies of ethical dilemmas in communicable disease management **Student Presentations and Discussion**

	Students present on a communicable disease of their choice Discussion and reflection on the module

Learning and Teaching Strategies	
Strategies	Lectures: Traditional lectures can be used to provide foundational knowledge on communicable diseases, including their epidemiology, transmission, prevention, and control measures. 2. Case Studies: Case studies can be used to engage students in critical thinking and problem-solving. Real-life scenarios can be presented to students, allowing them to analyze and apply their knowledge of communicable diseases. 3. Group Discussions: Group discussions can be used to encourage active participation and collaboration among students. This can involve discussing specific communicable disease cases, analyzing outbreak situations, or debating ethical issues related to communicable disease management. 4. Practical Exercises: Practical exercises can provide hands-on experience in communicable disease control. This can include activities such as outbreak investigations, contact tracing, or designing prevention and control strategies. 5. Multimedia Resources: Utilizing multimedia resources such as videos, interactive modules, and online platforms can enhance student engagement and understanding of communicable diseases. 6. Guest Speakers: Inviting guest speakers, such as public health professionals or experts in the field of communicable diseases, can provide real-world perspectives and insights to students. 7. Field Visits: Organizing field visits to public health agencies, laboratories, or healthcare facilities can give students a practical understanding of communicable disease control measures and the role of different stakeholders. 8. Assessments: Assessments can be used to evaluate students' understanding and application of knowledge related to communicable diseases. This can include quizzes, assignments, presentations, or research projects.

Student Workload (SWL)			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #5, #9
	Assignments	1	10%(10)	Continuous	All
	Projects / Lab.				
	Report	1	10%(10)		
Summative assessment	**Midterm Exam**	2hr	20% (20)	7	LO #1 - #6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction to Communicable Diseases
Week 2	Transmission of Communicable Diseases
Week 3	Respiratory Infectious Diseases
Week 4	Sexually Transmitted Infections
Week 5	Vector-Borne Diseases
Week 6	Foodborne and Waterborne Diseases
Week 7	Midterm exam
Week 8	Zoonotic Diseases
Week 9	Emerging and Re-emerging Diseases
Week 10	Global Health and Communicable Diseases
Week 11	Telemedicine and Communicable Diseases
Week 12	Communicable Diseases and Public Health
Week 13	Communicable Diseases and Public Health
Week 14	Communicable Diseases and Ethics
Week 15	Student Presentations and Discussion

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Control of Communicable Diseases Manual. David L. Heymann, MD. American Public Health Association (APHA). 20th Edition (2020)	YES
Recommended Texts		
Websites	https://www.open.edu/openlearncreate/mod/oucontent/view.php?id=85&printable	

Grading Scheme

Group	Grade		Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent		90 - 100	Outstanding Performance
	B - Very Good		80 - 89	Above average with some errors
	C - Good		70 - 79	Sound work with notable errors
	D - Satisfactory		60 - 69	Fair but with major shortcomings
	E - Sufficient		50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail		(45-49)	More work required but credit awarded
	F – Fail		(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Advanced Object Oriented programming**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS204**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		UGII	**Semester of Delivery**		4
Administering Department		IMS	**College**	CSIS	
Module Leader	Dr. Raidah S. Khudeyer		**e-mail**	raidah.khudayer@uobasrah.edu.iq	
Module Leader's Acad. Title		Prof.	**Module Leader's Qualification**		Ph. D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules			
Prerequisite module	IMS203 / Object Oriented Programming	**Semester**	
Co-requisites module	IMS301 / Web Development	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. Understanding Advanced OOP Concepts: Gain a deep understanding of advanced object-oriented programming principles such as inheritance, polymorphism, abstract classes, and interfaces. 2. Design Patterns: Learn various design patterns and their application in software development, including creational, structural, and behavioral patterns. 3. Exception Handling and Error Management: Develop skills in handling exceptions and managing errors effectively in object-oriented programs. 4. Generics and Collections: Explore the use of generics to create reusable and type-safe code, and understand how to work with different collection classes. 5. Multithreading and Concurrency: Learn the concepts of multithreading, synchronization, and concurrent programming to develop efficient and responsive applications. 6. Database Connectivity and ORM: Understand how to connect to databases, perform CRUD operations, and map objects to relational databases using JDBC or ORM frameworks. 7. GUI Development: Acquire skills in building graphical user interfaces (GUIs) using event-driven programming and GUI frameworks. 8. Advanced Topics in OOP: Explore advanced concepts such as reflection, serialization, deserialization, and dynamic class loading. 9. Testing and Debugging: Learn effective testing techniques, including unit testing and debugging strategies, to ensure the quality and reliability of object-oriented programs. 10. Software Development Lifecycle: Understand different software development methodologies, agile practices, and version control systems to effectively collaborate and manage projects. 11. Web Development with OOP: Gain knowledge of web development frameworks and apply object-oriented principles to build web applications. 12. Security in OOP: Understand common security vulnerabilities in object-oriented programming and learn secure coding practices, authentication, and authorization techniques. 13. Project Work: Apply the learned concepts and skills to complete a small-scale object-oriented programming project, demonstrating proficiency in advanced OOP concepts and practical implementation.

Module Learning Outcomes	1. Proficiency in advanced OOP concepts: Students should have a solid understanding of advanced OOP principles such as inheritance, polymorphism, abstract classes, interfaces, and design patterns. 2. Ability to apply OOP principles in software development: Students should be able to apply OOP concepts to design and develop complex software systems, using appropriate design patterns and best practices. 3. Competence in using advanced language features: Students should be familiar with and able to effectively use advanced language features related to OOP, such as generics, reflection, serialization, and multithreading. 4. Understanding of database connectivity and ORM: Students should be able to connect to databases, perform CRUD operations, and map objects to relational databases using appropriate techniques and frameworks. 5. Proficiency in GUI development: Students should be able to develop graphical user interfaces (GUIs) using OOP principles and event-driven programming, creating interactive and user-friendly applications. 6. Knowledge of software development lifecycle: Students should have an understanding of software development methodologies, version control systems, testing and debugging techniques, and agile development practices. 7. Awareness of security considerations in OOP: Students should be aware of common security vulnerabilities in OOP and be able to apply secure coding practices to mitigate these risks. 8. Project work and problem-solving skills: Students should have the ability to work on a small-scale OOP project, applying their knowledge and skills to solve real-world problems and demonstrate their understanding of advanced OOP concepts.
Indicative Contents	Indicative content includes the following. 1. Advanced OOP Concepts: - Inheritance and polymorphism - Abstract classes and interfaces - Method overriding and overloading - Access modifiers and encapsulation 2. Design Patterns: - Creational patterns (e.g., Singleton, Factory) - Structural patterns (e.g., Adapter, Decorator) - Behavioral patterns (e.g., Observer, Strategy) - Architectural patterns (e.g., MVC, MVVM)

	3. Exception Handling and Error Management: - Understanding exceptions and error handling - Try-catch blocks and exception propagation - Custom exception classes and handling techniques 4. Generics and Collections: - Introduction to generics in Java - Generic classes and methods - Working with collections (e.g., lists, sets, maps) 5. Multithreading and Concurrency: - Introduction to multithreading - Thread synchronization and locks - Concurrent programming concepts and techniques 6. Database Connectivity and ORM: - Connecting to databases using JDBC or ORM frameworks - Performing CRUD operations - Mapping objects to relational databases 7. GUI Development: - Introduction to graphical user interface (GUI) development - Event-driven programming - Building interactive applications using GUI frameworks 8. Advanced Topics in OOP: - Reflection and introspection - Serialization and deserialization - Dynamic class loading 9. Testing and Debugging: - Unit testing principles and frameworks - Debugging techniques and tools - Test-driven development (TDD) practices 10. Project Work and Review: - Students work on a small-scale OOP project

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Design Patterns: Students should learn and apply various design patterns to solve common software design problems. This includes understanding creational, structural, and behavioral patterns and knowing when and how to use them effectively. 2. Code Reusability: Emphasize the importance of writing reusable code by utilizing inheritance, interfaces, and abstract classes. Students should learn how to create modular and extensible code that can be easily maintained and reused in different contexts. 3. Exception Handling: Teach students how to handle exceptions effectively by using try-catch blocks, custom exception classes, and appropriate error handling techniques. They should understand the importance of proper error management for robust and reliable software. 4. Multithreading and Concurrency: Introduce students to the concepts of multithreading and concurrency, including thread synchronization, locks, and concurrent programming techniques. They should learn how to write thread-safe code and handle concurrent access to shared resources. 5. Database Connectivity and ORM: Provide students with knowledge of connecting to databases using JDBC or Object-Relational Mapping (ORM) frameworks. They should learn how to perform CRUD operations, map objects to relational databases, and understand the principles of database design. 6. GUI Development: Teach students how to develop graphical user interfaces (GUIs) using OOP principles. They should learn event-driven programming, GUI frameworks, and how to build interactive applications with user-friendly interfaces. 7. Testing and Debugging: Emphasize the importance of testing and debugging in the software development process. Students should learn unit testing principles, debugging techniques, and practices such as test-driven development (TDD) to ensure the quality and reliability of their code.

Student Workload (SWL)			
Structured SWL (h/sem)	79	**Structured SWL (h/w)**	5

Unstructured SWL (h/sem)	96	**Unstructured SWL (h/w)**	6.4
Total SWL (h/sem)	**175**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction to Advanced Object-Oriented Programming Concepts
Week 2,3	Design Patterns

Week 4	Exception Handling and Error Management
Week 5,6	Generics and Collections
Week 7	**Mid-term Exam.**
Week 8,9	Multithreading and Concurrency
Week 10	Database Connectivity and ORM
Week 11	GUI Development
Week 12	Advanced Topics in OOP
Week 13	Testing and Debugging
Week 14	Advanced OOP Concepts
Week 15	Project Work and Review
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Basic Java syntax and concepts
Week 2,3	Implementing inheritance hierarchies
Week 4	Handling exceptions using try-catch blocks
Week 5,6	Working with generic classes and methods
Week 7	**Mid-term Exam**
Week 8,9	Creating and managing threads in Java
Week 10,11	Executing SQL queries and handling results
Week 11	Event-driven programming and handling user input
Week 12	Debugging techniques and tools in Java
Week 13,14	Exploring advanced Java libraries and APIs (e.g., JavaFX, Java Streams)
Week 15	Students work on a Java-based project applying advanced OOP concepts
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	A. A. Puntambekar. (2020). Object oriented programming,	No
Recommended Texts	[1] C. Thomas Wu (2010). An Introduction to Object-Oriented Programming with Java. Fifth Edition. McGraw-Hill. [2] Herbert	No

	Schildt (2007). Java: The Complete Reference. Seventh Edition. McGraw-Hill.	
Websites	https://www.google.iq/books/edition/Object_Oriented_Programming/WKUbEAAAQBAJ?hl=en&gbpv=1&dq=object+oriented+programming+java&printsec=frontcover	

Group	Grade	Marks %	Definition
Success Group (50 - 100)	**A –** Excellent	90 - 100	Outstanding Performance
	B - Very Good	80 - 89	Above average with some errors
	C – Good	70 - 79	Sound work with notable errors
	D - Satisfactory	60 - 69	Fair but with major shortcomings
	E – Sufficient	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	(45-49)	More work required but credit awarded
	F – Fail	(0-44)	Considerable amount of work required

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of Health Database Systems**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS208**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	IMS		**College**	CSIS	
Module Leader	Asaad A. Alhijaj & Ansam Kadhum		**e-mail**	asaad.abdulhassan@uobasrah.edu.iq & ansam.abdulhadi@uobasrah.edu.iq	
Module Leader's Acad. Title	Asst. Prof & Assist Lecturer		**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Develop an understanding of the basic concepts and principles of health database systems. 2. Gain proficiency in designing and implementing a database system for health-related purposes. 3. Learn how to organize and manage patient records and health information using a database system. 4. Understand the role of data analytics in health database systems and how it can be used to improve patient care. 5. Develop skills in data extraction, analysis, and reporting for decision-making and research purposes in healthcare. 6. Explore the ethical and legal considerations associated with health database systems, including patient privacy and data security. 7. Gain hands-on experience in using popular health database management software and tools. 8. Understand the challenges and potential benefits of using interoperable health database systems for healthcare organizations. 9. Explore the role of health informatics in integrating clinical and administrative data within a database system. 10. Develop critical thinking and problem-solving skills in troubleshooting and optimizing health database systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the basics of health database systems: Students will acquire knowledge of the fundamental concepts, principles, and structures underlying health database systems. They will grasp the importance of data management in the healthcare sector. 2. Proficiency in database design: Students will learn how to design health databases, including creating tables, defining relationships between tables, and establishing data integrity constraints. They will develop skills in organizing and structuring medical information. 3. Data querying and manipulation: Students will gain expertise in querying health databases using Structured Query Language (SQL). They will be able to retrieve, update, and delete data from the database tables. They will also learn the importance of data privacy and security. 4. Understanding electronic health records (EHRs): Students will be introduced to electronic health record systems and their role in healthcare settings. They will comprehend the advantages and challenges associated with the implementation of EHRs.

	5. Data analysis and reporting: Students will learn how to analyze health data stored in databases, including generating reports and visualizations. They will be able to interpret data trends and patterns to aid decision-making in healthcare. 6. Awareness of ethical and legal issues: Students will gain knowledge of the ethical and legal considerations related to health database systems, including confidentiality, privacy, consent, and compliance with regulations such as HIPAA (Health Insurance Portability and Accountability Act). 7. Application of health database systems: Students will understand how health database systems are utilized in various healthcare domains, such as clinical research, patient management, electronic prescribing, and public health surveillance. 8. Integration with other health information systems: Students will explore the integration of health database systems with other healthcare information systems, such as laboratory information systems, picture archiving and communication systems, and decision support systems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Understanding of database concepts: Students should have a solid understanding of database fundamentals, including concepts such as data models, relational databases, data normalization, and data integrity. 2. Ability to design and implement a health database system: Students should be able to design a database system that meets the specific needs of a healthcare organization, considering factors such as data types, data relationships, and security. 3. Competence in using database management systems (DBMS): Students should be able to demonstrate proficiency in using popular DBMS tools such as Microsoft SQL Server, Oracle, or MySQL to create, manage, and manipulate health-related data. 4. Knowledge of healthcare data standards: Students should be familiar with common healthcare data standards, such as Health Level Seven (HL7) and International Classification of Diseases (ICD), and understand how these standards are used in health database systems. 5. Ability to query and analyze health data: Students should be able to write SQL queries to extract relevant information from a health database, perform data analysis, and generate meaningful reports based on specific requirements.

	6. Awareness of healthcare privacy and security issues: Students should be aware of the legal and ethical considerations surrounding health data, including privacy regulations like the Health Insurance Portability and Accountability Act (HIPAA), and incorporate appropriate security measures into their database designs. 7. Understanding of healthcare information management: Students should grasp the importance of healthcare information management, including data governance, data quality assurance, and the role of health information systems in improving patient care and operational efficiency. 8. Application of database concepts to real-world scenarios: Students should be able to apply their knowledge of database systems to solve real-world problems in the healthcare domain, such as creating electronic health records (EHRs), designing healthcare analytics systems, or building clinical decision support tools.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Start with the basics: Begin by providing an overview of health database systems, including their purpose, structure, and importance in the healthcare industry. Introduce foundational concepts such as data modeling, data types, and database design principles. 2. Practical examples and case studies: Use real-world examples and case studies to demonstrate the implementation and utilization of health database systems. This will help students understand how these systems are used in various healthcare settings and the benefits they provide. 3. Hands-on experience: Offer practical exercises and assignments that require students to work with actual health databases. This can involve tasks such as data entry, querying databases, generating reports, and analyzing data. Hands-on experience will reinforce theoretical concepts and allow students to develop practical skills. 4. Guest speakers and industry professionals: Invite guest speakers who have experience working with health database systems to share their insights and expertise. This will provide students with a broader understanding of the industry and its practical applications. Additionally, industry professionals can offer career guidance and potential internship or job opportunities. 5. Collaborative projects: Assign group projects where students work together to design and implement a health database system. This encourages teamwork, critical thinking, and problem-solving skills. It also allows students

	to learn from each other and gain practical experience in a collaborative environment. 6. Stay updated with current technologies: Keep the module content up to date with the latest advancements in health database systems. Regularly review and update the syllabus to incorporate new technologies, trends, and best practices. This will ensure that students are equipped with the most relevant skills and knowledge needed in the industry. 7. Assessments and feedback: Provide regular assessments, quizzes, and feedback to help students gauge their understanding and progress. This can be in the form of individual assignments, group projects, or exams. Prompt feedback will enable students to identify areas for improvement and enhance their learning. 8. Professional development opportunities: Offer workshops or seminars on topics related to health database systems, such as data privacy and security, data analysis, or data visualization. Encourage students to participate in relevant conferences, webinars, or training sessions to stay updated with the latest advancements. This will foster a mindset of continuous learning and professional development. 9. Industry visits or internships: Facilitate visits to healthcare organizations or arrange internships for students to gain firsthand exposure to health database systems in a real-world setting. This practical experience will help bridge the gap between academic knowledge and practical application, allowing students to apply what they have learned in a professional environment. 10. Encourage critical thinking and research: Promote critical thinking and research skills by assigning research papers or projects that explore emerging trends, challenges, or innovations in health database systems. This will encourage students to think critically, analyze information, and develop a deeper understanding of the subject matter.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem)	**125**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Databases
Week 2	Conceptual Database Design
Week 3	Entity Relationship Diagram (ERD) 4
Week 4	Enhanced ER (EER) Model Concepts
Week 5	Relational Data Model and Relational Database Constraints
Week 6	Relational Algebra-- 1st Assignment
Week 7	Structured Query Language (SQL)
Week 8	Advanced SQL
Week 9	Midterm Exam
Week 10	Normalization
Week 11	File Structure and Indexes
Week 12	Database Performance Issues –
Week 13	2nd Assignment
Week 14	Mini-project evaluation
Week 15	Review and Exam Preparation: a review of key topics and concepts, exam practice, and preparation
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab1: Introduction to MS-Access
Week 2	Lab2: Tables Design 1
Week 3	Lab3:Tables Design 2
Week 4	Lab4:Forms
Week 5	1st Quiz
Week 6	Lab5:Queries1
Week 7	Lab6:Queries2
Week 8	Lab7:Reports
Week 9	2nd Quiz
Week 10	Lab8:Switchboard and user interface
Week 11	Lab9: Macro's and VBA
Week 12	Mini-Project Projects Evaluation

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	[1] Kroenke, David, and David J. Auer. Database concepts. Prentice Hall, 2013. [2] Silberschatz, Abraham, Henry F. Korth, and S. Sudarshan. Database system concepts. 4th edition. Hightstown: McGraw-Hill, 2002 ISBN 0-07-255481-9. [3] Elmasri, Ramez., Fundamentals of database systems / Ramez Elmasri, Shamkant B. Navathe.—6th ed.,p. cm. ISBN-13: 978-0-136-08620-8	No
Recommended Texts	Bagui, S. & Earp, R (2004). Learning SQL A Step-by-Step Guide Using Access®. Addison-Wesley Publishing. ISBN: 0-32-111904-5.	No
Websites	http://mailman.cs.yale.edu/mailman/listinfo/db-book-list	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group	**A –** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Operating Systems**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS209**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	IMS		**College**	CSIT	
Module Leader	Dr. Salma A. Mahmood		**e-mail**	salma.mahmood@uobasrah.edu.iq	
Module Leader's Acad. Title	assistant professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Jenan A. Abdalhasan		**e-mail**	jenan.alkereem@uobasrah.edu.iq	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	1. Understand the purpose and functions of an operating system: • Learn about the role of an operating system in managing computer hardware and software resources. • Understand how an operating system provides a user interface and facilitates communication between applications and hardware. 2. Study process management: • Understand the concept of a process and its components. • Learn about process scheduling algorithms, process synchronization, and inter-process communication mechanisms. 3. Explore memory management: • Understand the concept of memory hierarchy and memory organization in a computer system. • Learn about memory allocation techniques, virtual memory, and memory protection mechanisms. • Learn about memory placement algorithms. 4. Study file systems: • Understand the concept of a file and file system organization. • Learn about file operations, directory structures, and file system implementation techniques. 5. Explore input/output (I/O) management: • Understand the principles of I/O devices and their interaction with the operating system. • Learn about I/O device drivers, buffering, and I/O scheduling algorithms. 6. Study deadlock handling: • Understand the concept of a deadlock and its causes. • Learn about deadlock prevention, avoidance, detection, and recovery strategies. 7. Understand security and protection mechanisms: • Learn about access control mechanisms, authentication, and authorization. • Study different security threats and techniques for protecting the operating system and user data. 8. Explore distributed systems: • Understand the concepts and challenges of distributed systems. • Learn about distributed file systems and synchronization algorithms in distributed environments. 9. Analyze case studies: • Study real-world operating systems like Unix, Linux, Windows, or macOS. • Understand these operating systems' design principles, architectural components, and functionalities.

Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Understand the fundamental concepts and principles of operating systems. 2. Understand the relationship between hardware and software components in an operating system. 3. Understand memory management in operating systems. 4. Describe virtual memory concepts, including paging, segmentation, and demand paging. 5. Understand the structure of a file system. 6. Describe the principles of I/O devices and their interaction with the operating system. 7. Explain I/O device drivers, buffering, and I/O scheduling algorithms. 8. Understand the security and protection mechanisms in operating systems. 9. Explain security threats and countermeasures in an operating system. 10. Implement security measures to protect the system and user data. 11. Understand the architectural components and functionalities of these operating systems. 12. Compare and evaluate the strengths and weaknesses of different operating systems.
Indicative Contents **المحتويات الإرشادية**	1. Introduction to Operating Systems: • Purpose and types of operating systems. • Evolution and history of operating systems. 2. Process Management: • Processes, threads, and scheduling. • Process synchronization and communication. 3. Memory Management: • Memory organization and allocation techniques. • Virtual memory and paging. 4. File Systems: • File system structure and operations. • Directory structures and file allocation methods. 5. I/O Management: • I/O devices, drivers, and operations. • I/O buffering and scheduling. 6. Deadlocks: • Deadlock concept, prevention, detection, and recovery. 7. Security and Protection: • User authentication, access control, and security threats. 8. Distributed Systems: • Concepts, challenges, and synchronization in distributed systems. 9. Case Studies: • Analysis of real-world operating systems and their features.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Employing these strategies can create a comprehensive and engaging learning experience in an operating system module, such as lectures, interactive discussions, hands-on lab sessions, case studies, assignments, projects, guest lectures, online resources, assessments, group projects, and continuous support.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**64**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**61**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	#1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	#3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	#5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	#1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to Operating Systems** • Purpose, layered, function, and types of operating systems • The history of operating systems
Week 2	**The boot process from power-on to operating system loading** • The boot process from power-on to operating system loading • Practical Example (Windows Boot)
Week 3	**Components of an Operating Systems** • Shell, kernel • Function, types different
Week 4	**Introduction of System Call** • Services, features, types
Week 5	Privileged and Non-Privileged Instructions in an Operating System
Week 6	**Process Management** • Processes attributes, States, Lifecycle • Types of Schedulers, Dispatchers, Context Switching, Multiprogramming
Week7	Midterm Exam
Week8	**CPU Scheduling in Operating Systems** • First-Come, First-Served (FCFS) • Shortest Job First (SJF) • Round Robin (RR) • Priority Scheduling • Multilevel Queue
Week 9	**Memory Management** • Memory Organization and Allocation Techniques • Memory Management Techniques • Virtual Memory
Week 10	**Contiguous Memory Allocation** Memory Allocation Algorithms • First-Fit Memory Allocation • Best-Fit Memory Allocation • Worst-Fit Memory Allocation • Next-Fit Memory Allocation
Week 11	**Non-Contiguous Memory Allocation** • Paging • Segmentation • Fragmentation

Week 12	**Handling Deadlocks** • Deadlock concept and necessary conditions • Deadlock Handling Strategies
Week 13	**File Systems** • File System Structure and Operations
Week 14	Presentation in PowerPoint topics

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	**MS-DOS Commands** • Creating, reading, and writing files in MS-DOS • implementing file operations, and directory structures.
Week 2	**OS Module in Python** • Creating, reading, and writing files in Python • implementing file operations and directory structures
Week 3	Implementing I/O operations in Python
Week 4	**Implementing Process Management in Python** • Subprocess Module • Multiprocessing Module
Week 5	**Processes threads in Python** • Threading and Multithreading Module • Thread synchronization Module
Week 6	**Implementing process scheduling algorithms in Python** • First-Come, First-Served (FCFS) Scheduling Algorithm with the same arrival time. • First-Come, First-Served (FCFS) Scheduling Algorithm with different arrival times.
Week 7	**Implementing process scheduling algorithms in Python** • Non-Preemptive Shortest Job First (SJF) Scheduling Algorithm. • Shortest Remaining Time First (SRTF) Scheduling Algorithm or Preemptive (SJF).
Week 8	**Implementing process scheduling algorithms in Python** • Round Robin (RR) Scheduling algorithm with processes of the same arrival time. • Round Robin (RR) Scheduling algorithm with different arrival times.
Week 9	**Implementing process scheduling algorithms in Python** • Non-preemptive Priority CPU Scheduling Algorithm • Preemptive Priority CPU Scheduling Algorithm
Week 10	**Implementing process scheduling algorithms in Python** Multilevel Queue (MLQ) in Python

Week 11	**Memory Allocation Algorithms (Fixed Partition)** • First - Fit memory management algorithm • Best - Fit memory management algorithm
Week 12	**Memory Allocation Algorithms (Fixed Partition)** • Next - Fit memory management algorithm • Worst - Fit memory management algorithm

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Textbook: 1. "Operating System Concepts" by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne, 2020 2. "Modern Operating Systems" by Andrew S. Tanenbaum and Herbert Bos, 2014.	Yes (E-copy)
Recommended Texts	"Operating Systems: Internals and Design Principles" by William Stallings.	Yes (E-copy)
Websites	GeeksforGeeks: https://www.geeksforgeeks.org/	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Epidemiology and Biostatistics for health informatics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MIS210**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	MIS		**College**	CSIS	
Module Leader	Dr. Labeed Abdullah Najim		**e-mail**	Labeed.najim@uobasrah.edu.iq	
Module Leader's Acad. Title	Assist Proff		**Module Leader's Qualification**	PHD	
Module Tutor	Dr. Labeed Abdullah Najim		**e-mail**	Labeed.najim@uobasrah.edu.iq	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	2.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand fundamental concepts: Introduce students to the basic principles, terminologies, and concepts of epidemiology and biostatistics, providing them with a solid foundation for further exploration. 2. Analyze health data: Enable students to analyze health-related data using appropriate statistical techniques and tools commonly used in health informatics. 3. Interpret research findings: Train students to interpret and critically evaluate epidemiological studies and research findings, identifying strengths and limitations in study design and data analysis. 4. Apply epidemiological methods: Teach students how to apply various epidemiological methods to study disease patterns, risk factors, and health outcomes in populations using health informatics data. 5. Apply biostatistical techniques: Familiarize students with different biostatistical techniques for data summarization, hypothesis testing, regression analysis, and other statistical procedures relevant to health informatics. 6. Data visualization: Enable students to effectively visualize and communicate health data through charts, graphs, and other visualization tools, aiding in data-driven decision-making. 7. Ethical considerations: Introduce students to ethical and legal considerations in health informatics research, emphasizing the importance of data privacy, confidentiality, and informed consent. 8. Real-world applications: Provide practical exposure to health informatics projects and case studies where epidemiological and biostatistical principles are applied to address public health issues and inform healthcare decisions. 9. Data management: Train students in data management techniques and data quality assurance to ensure accurate and reliable health informatics data. 10. Problem-solving skills: Develop problem-solving skills in students, enabling them to identify and address public health challenges using epidemiological and biostatistical approaches. 11. Collaborative skills: Foster teamwork and collaboration among students to work on group projects and analyze health informatics data collectively. 12. Lifelong learning: Instill a passion for continuous learning and encourage students to stay updated with the latest advancements in epidemiology, biostatistics, and health informatics throughout their careers.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge of Epidemiological Concepts: • Understand fundamental epidemiological concepts, such as disease occurrence, prevalence, incidence, and risk factors. • Describe different study designs used in epidemiology and their applications in health informatics. 2. Knowledge of Biostatistical Techniques: • Comprehend various biostatistical techniques, including descriptive statistics, probability distributions, and hypothesis testing. • Understand regression analysis and its applications in health informatics.

	3. Data Analysis and Interpretation: • Analyze health informatics data using appropriate statistical software and interpret the results. • Identify potential biases and limitations in epidemiological studies and statistical analyses. 4. Application of Epidemiological Methods: • Apply epidemiological methods to investigate disease patterns and trends in health informatics datasets. • Use epidemiological principles to identify risk factors and associations with health outcomes. 5. Ethical Considerations: • Demonstrate an understanding of ethical and legal considerations related to health informatics research, data privacy, and confidentiality. 6. Data Visualization and Communication: • Effectively present health informatics data using visualizations such as charts, graphs, and maps to communicate key findings. 7. Problem-Solving Skills: • Apply epidemiological and biostatistical approaches to address public health challenges and make data-driven decisions. 8. Data Management: • Demonstrate proficiency in data management techniques and data quality assurance processes in health informatics. 9. Collaborative Skills: • Work effectively in a team, contributing to group projects and engaging in discussions related to health informatics research. 10. Lifelong Learning: • Display an enthusiasm for continuous learning and a willingness to stay updated with the latest developments in epidemiology, biostatistics, and health informatics. 11. Application in Real-World Settings: • Apply acquired knowledge and skills to conduct meaningful research in health informatics and contribute to evidence-based decision-making in public health.
Indicative Contents المحتويات الإرشادية	Introduction to Epidemiology and Biostatistics in Health Informatics: • Overview of the course and its goals • Basic concepts and terminologies in epidemiology and biostatistics Study Designs in Epidemiology: • Types of observational studies (cross-sectional, cohort, case-control) • Introduction to randomized controlled trials (RCTs) Measures of Disease Occurrence and Association: • Calculation of incidence and prevalence rates • Understanding risk ratios, odds ratios, and relative risk Introduction to Biostatistics: • Different types of data (categorical, continuous, discrete) • Data collection methods in health informatics Probability and Probability Distributions:

	• Basic principles of probability • Common probability distributions (normal, binomial, Poisson) Descriptive Statistics: • Measures of central tendency and variability • Data visualization techniques in health informatics Statistical Inference: Hypothesis Testing: • Formulating null and alternative hypotheses • Conducting t-tests and chi-square tests Correlation and Regression Analysis: • Understanding correlation between variables • Simple and multiple linear regression models Analyzing Categorical Data: • Chi-square tests for independence • Logistic regression for binary outcomes Survival Analysis: • Kaplan-Meier survival curves • Cox proportional hazards model Introduction to Epidemiological Surveillance and Outbreak Investigation: • Disease surveillance systems in health informatics • Steps in investigating disease outbreaks Application of Epidemiology and Biostatistics in Health Informatics Projects: • Integrating epidemiological principles and biostatistical techniques in real-world projects • Data analysis using software (e.g., R, Python) Ethical and Legal Considerations in Epidemiology and Health Informatics: • Privacy, security, and confidentiality issues in health data • Discussion on ethical implications of data use and research

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching Epidemiology and Biostatistics for a health informatics module requires a combination of effective strategies to engage students and facilitate their understanding of complex concepts. Here are some strategies to consider: 1. Active learning: Encourage active participation through group discussions, problem-solving exercises, and hands-on data analysis. 2. Case studies and real-life examples. 3. Data analysis projects: Assign data analysis projects that involve using health informatics datasets. 4. Online resources and interactive tools. 5. Formative assessments and feedback. 6. Peer learning and group projects: Encourage peer learning through group projects and collaborative activities.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.06
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Epidemiology and Biostatistics in Health Informatics
Week 2	Study Designs in Epidemiology: Observational and Experimental Studies
Week 3	Measures of Disease Occurrence and Association
Week 4	Introduction to Biostatistics: Data Types and Data Collection
Week 5	Probability and Probability Distributions
Week 6	Descriptive Statistics
Week 7	Midterm exam

Week 8	Correlation and Regression Analysis
Week 9	Analyzing Categorical Data
Week 10	Survival Analysis
Week 11	Introduction to Epidemiological Surveillance and Outbreak Investigation
Week 12	Application of Epidemiology and Biostatistics in Health Informatics Projects
Week 13	Ethical and Legal Considerations in Epidemiology and Health Informatics
Week 14	Review
Week 15	**Final Exam**
Week 16	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to R programming for data analysis
Week 2	Introduction to R programming for data analysis
Week 3	Introduction to R programming for data analysis
Week 4	Lab 1: Introduction to Epidemiology and Biostatistics. Overview of epidemiology and biostatistics in health informatics.
Week 5	Lab 2: Descriptive Epidemiology • Calculation and interpretation of measures of disease frequency using R • Data visualization techniques in epidemiology using R
Week 6	Lab 3: Study Designs in Epidemiology • Cohort studies: design and analysis using R • Case-control studies: design and analysis using R
Week 7	Lab 4: Measures of Association • Calculation and interpretation of relative risk and odds ratio using R • Introduction to confounding and effect modification in epidemiology
Week 8	Lab 5: Data Collection and Management in Epidemiology • Data collection methods in health informatics • Data preprocessing and cleaning using R
Week 9	Lab 6: Introduction to Biostatistics • Descriptive statistics using R

	• Probability and probability distributions using R
Week 10	Lab 8: Introduction to Biostatistics • Descriptive statistics using R • Probability and probability distributions using R
Week 11	Lab9: Statistical Analysis in Epidemiology • Hypothesis testing using R • Regression analysis using R
Week 12	Lab 10: Epidemiological Study Designs in Health Informatics • Application of study designs in health informatics research • Analysis of real-world health informatics datasets using R
Week 13	Lab 11: Data Visualization and Interpretation • Advanced data visualization techniques using R • Effective communication of epidemiological findings using R
Week 14	Lab 12: Applications of Epidemiology and Biostatistics in Health Informatics • Surveillance and outbreak investigation using R • Risk assessment and prediction modeling using R
Week 15	Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Epidemiology: An Introduction by Kenneth J. Rothman.	No
Recommended Texts	1. Modern Epidemiology by Kenneth J. Rothman. 2. Epidemiology and Biostatistics Secrets by Robert J. Nordness. 3. R for Epidemiology by Brad Cannell. 4. Epidemiology with R by Bendix Carstensen	No
Websites	https://epirhandbook.com/en/ https://www.tephinet.org/tephinet-learning-center/tephinet-library/epidemiologist-r-handbook	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	**A –** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Medical Data Acquisition Methods**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS211**				
ECTS Credits	**2**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	IMS		**College**	CSIT	
Module Leader	Dr. Mustafa Moosa Qasim		**e-mail**	mustafa_mq87@uobasrah.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Mustafa Moosa Qasim		**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	2.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The module course on medical data acquisition methods divides the main objectives for undergraduates seeking a bachelor's degree in the Department of Intelligent Medical Systems as follows: The first objective of this module course is to provide an overview of the importance of medical data acquisition in medical, healthcare, and biomedical research. It also explains what medical data acquisition methods (MDAM) are, why data acquisition in medical systems is important, and how medical data is used. Additionally, the objective examination looks at the various types of medical data and elucidates the ethical and legal considerations involved in medical data acquisition. The second objective is designed to provide a comprehensive understanding of the various techniques and methodologies used to acquire medical data. Students will learn about the principles, tools, and technologies employed in the acquisition, preprocessing, and management of medical data for research and clinical applications. This objective will cover both theoretical concepts and practical hands-on experience with data acquisition tools and systems. Additionally, it is also intended to inspire students to explore publicly available medical datasets and repositories that can be beneficial for gaining hands-on experience in data acquisition. Adding to that, understand what the major challenge is in ensuring medical data accuracy and collection. The third objective is to discuss several emerging technologies in medical data acquisition that show promise for revolutionizing medical research. Moreover, it is important to understand the drawbacks of traditional paper medical records and the potential role of computers in data storage, retrieval, and interpretation. Furthermore, it is intended to inspire students to explore what the alternatives are to entering data into a medical database. These objectives of this module course on medical data acquisition methods and emerging technologies will allow students to search sources for the latest advancements and participate in recognizing the medical data acquisition methods or tools from the hospitals. Further, they will recognize the type of system built based on medical data. Finally, it highlights the natural language processing (NLP) used in the medical field and how NLP can revolutionize healthcare practices and decision-making. In sum, the students will be able to use this knowledge more easily throughout this course to analyze medical data scenarios and propose appropriate data collection methods as needed.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	This module's learning outcome for the course on medical data acquisition methods is to ensure that undergraduates have an in-depth understanding of the subject matter and develop practical skills related to medical data acquisition methods technology. Upon completion of the course, students will be able to: **1.** Learn the fundamental concepts and principles of medical data acquisition methods: Students will develop a solid grasp of the underlying theories and principles that govern medical data acquisition. **2.** Identify and select appropriate medical data acquisition techniques: Students will be able to assess different data acquisition methods and choose the most suitable ones based on specific medical scenarios and research objectives. **3.** Students will gain the necessary skills to understand and explore medical data acquisition devices by demonstrating proficiency in their use through practical exercises. **4.** Students will understand the ethical issues surrounding medical data collection, including patient privacy, data security, and informed consent, and they will be able to apply ethical principles in their data acquisition practices. **5.** Analyze and interpret medical data: Students will learn to process and analyze acquired medical data using appropriate software tools, deriving meaningful insights, and drawing valid conclusions from the data. **6.** By allowing students to conduct experiments involving medical data acquisition, they will learn how to design that address medical research questions and how to extract data either from systems or participants. **7.** Students will be able to identify potential issues and limitations associated with different data acquisition approaches and propose solutions to overcome them. **8.** Students will develop teamwork and communication skills, which are essential for successful collaboration in medical data acquisition projects, by effectively collaborating within a team. **9.** Students will be able to critically review and analyze scientific papers, extracting relevant information related to medical data acquisition methods. **10.** Students will learn to present their data acquisition findings and research results through oral presentations and written reports. **11.** Students will learn about the principles, tools, and modern technologies employed in the acquisition of medical data for research and clinical applications. **12.** Students will gain an understanding of the various systems utilized to gather information relating to medical data acquisition methods. **13.** Students will learn an overview of NLP and its applications, as well as future directions for NLP in medicine.

	14. Students will be encouraged to stay informed about the latest advancements in medical data acquisition methods and technologies, fostering a lifelong learning mindset. **15.** Students will understand the regulatory frameworks and standards governing medical data acquisition and demonstrate compliance in their research projects. Overall, this module aims to equip undergraduates with a strong foundation in medical data acquisition methods, preparing them to apply these skills in the healthcare domain and contribute to advancements in medical research and technology. These learning outcomes are designed in alignment with the overall goals and objectives of the course and adapted to the level for undergraduates in the Department of Intelligent Medical Systems.
Indicative Contents المحتويات الإرشادية	**1. General concepts of Medical Data Acquisition Methods (MDAM).** • Overview of MDAM course. • What are MDAM? • Importance of data acquisition in medical systems. • Ethical and legal considerations in medical data acquisition. **2. Types of medical data** • Structured, • Unstructured • Semi-structured **3. Essential MDAM.** • Patient Interviews • Physical Examination • Medical Imaging • Laboratory Tests • Vital Signs Monitoring • Electrocardiogram (ECG/EKG) • Electroencephalogram (EEG) • Patient Reported Outcome Measures (PROMs) • Observational Studies • Randomized Controlled Trials (RCTs) • Electronic Health Records (EHRs) • Health Surveys • Mobile Health (mHealth) and Wearable Devices. • Telemedicine • Genetic testing and biobanking **4. Emerging Technologies in Medical Data Acquisition.** • Internet of Medical Things (IoMT).

	• Artificial Intelligence (AI), Machine Learning (ML) and Deep Learning (DL) • Blockchain Technology. • 3D Medical Imaging. • Genomic Data Acquisition. • Health Information Exchange (HIE) Platforms. • Virtual Reality (VR) and Augmented Reality (AR). • Mobile Health (mHealth) Applications. • Big Data Analytics. • Smart Implants and Sensors. **5. Natural Language Processing (NLP) in Medicine.** • What is NLP? • Key applications and benefits of NLP in medicine. • Challenges in NLP in Medicine. **6. MDAM Design Project** • Project Scope and Objectives. • Data Sources and Integration • Choose Data Collection Method. • Data Storage and Management. • Project Presentation

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This module course will adopt a comprehensive delivery strategy that blends theoretical knowledge with practical hands-on experience. The goal is to help students understand various data acquisition methods, devices, and technologies commonly used in the medical field. This will be achieved through classes, exercises, reports, feedback, and assignments through this course that will be interesting to the students. Finally, the course helps students understand that working with medical data requires great responsibility because it involves sensitive information and can impact patient care. In summary, students will learn to always prioritize medical data collection, patient privacy, data accuracy, and ethical conduct throughout this module.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	10% (10)	2, 5, 8, and 12	LO#1-5
	Assignments	2	10% (10)	2 and 12	LO #1-7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #3-5
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #8
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1,2	General concepts of Medical Data Acquisition Methods (MDAM).
Week 3	Types of medical data.
Week 4,5,6,7	Essential MDAM.
Week 8	**Midterm Exam.**
Week 9,10,11,12	Emerging Technologies in Medical Data Acquisition
Week 13	Natural Language Processing (NLP) in Medicine.
Week 14	MDAM Design Project (Part 1).
Week 15	MDAM Design Project (Part 2).
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Rai, B. K., Kumar, G., & Balyan, V. (Eds.). AI and Blockchain in Healthcare. Springer Nature. (2023). 2. Pandey, R., Pandey, A., Maurya, P., & Singh, G. D. The Internet of Medical Things (IoMT) and Telemedicine Frameworks and Applications (pp. 76-104). IGI Global. (2022).	

	3. Kher, R. K., Paunwala, C., Thakkar, F., Kher, H., Paunwala, M., Sahoo, P. K., & Ladid, L. IoT Applications for Healthcare Systems. Springer International Publishing. (2022). 4. Sharma, H. K., Kumar, A., Pant, S., & Ram, M. Artificial intelligence, blockchain and IoT for smart healthcare. CRC Press. (2022). 5. Płaczek, B., & Koprowski, R. Data Acquisition: Recent Advances and Applications in Biomedical Engineering. (2021). 6. Magnuson, J. A., & Dixon, B. E. (Eds.). Public health informatics and information systems. Springer Nature. (2020). 7. Xing, L., Giger, M. L., & James, K. Min. Artificial Intelligence in Medicine: Technical Basis and Clinical Applications/Academic Press. (2020). 8. Kulkarni, A. J., Siarry, P., Singh, P. K., Abraham, A., Zhang, M., Zomaya, A., & Baki, F. (Eds.). Big Data Analytics in Healthcare. Springer. (2020). 9. Consoli, S., Recupero, D. R., & Petkovic, M. Data science for healthcare. Berlin: Springer International Publishing. (2019). 10. Yang, C. H., Huang, Y. J., Liu, A., Rong, Y., & Lee, T. F. Data acquisition and processing in biology and medicine. BioMed Research International, (2015). 11. De Robbio, A. (2012). Biobanks: Patents Or Open Science?. Elsevier. (2013). 12. Henderson, M. C., Tierney Jr, L. M., & Smetana, G. W. The patient history: An evidence-based approach to differential diagnosis. (2012). 13. Riener, R., Harders, M., Riener, R., & Harders, M. Introduction to virtual reality in medicine (pp. 1-12). Springer London. (2012).	No

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Health Service Management System**			**Module Delivery**	
Module Type	**BASIC**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS212**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	IMS		**College**	CSIT	
Module Leader	Arafat Naser jasim alyousuf		**e-mail**	arafatalyousuf1979@gmail.com	
Module Leader's Acad. Title	Ass.prof		**Module Leader's Qualification**	Phd	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To Ensuring secure communication and data exchange. 2. Utilizing data analytics for performance measurement 3. Making data-driven decisions for process improvement. 4. Providing patients with access to their health information. 5. Understanding healthcare regulations and compliance. 6. Protecting patient data and ensuring cybersecurity. 7. Embracing AI, machine learning, and predictive analytics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Here are brief learning outcomes for the biomedical instrument module: 1- Develop a holistic understanding of healthcare management systems and their role in healthcare delivery. 2- Acquire practical skills in managing healthcare services, resources, and patient care using technology. 3- Explore ethical, legal, and security considerations related to health service management systems. 4- Apply knowledge to enhance patient satisfaction, operational efficiency, and healthcare quality. 5- Efficient patient scheduling and appointment booking. 6- Optimizing patient flow and reducing waiting times. 7- Integrating appointment management systems with electronic health records.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	the main strategy for developing such a module is Blended Learning for Practical Competence by Defining specific, measurable, achievable, relevant, and time-bound (SMART) learning objectives for each module segment. And Combining online resources, video lectures, readings, and interactive activities for a balanced learning experience. then Incorporate in-person or virtual classroom sessions for discussions, collaborative activities, and hands-on workshops. for learners to apply learned concepts to real-world healthcare management challenges.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects /	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Health Service Management Systems
Week 2	Healthcare Operations and Workflow Analysis
Week 3	Patient Scheduling and Appointment Management
Week 4	Resource Allocation and Bed Management
Week 5	Managing medical supplies, medications, and equipment.
Week 6	Quality Improvement and Patient Safety
Week 7	Mid-term Exam
Week 8	Telehealth and Remote Patient Monitoring
Week 9	Healthcare Analytics and Reporting
Week 10	Regulatory Compliance and Data Security
Week 11	Patient Engagement and Communication
Week 12	Change Management and System Optimization

Week 13	Future Trends and Emerging Technologies
Week 14	Ethical considerations and potential challenges of advanced technologies.
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab **1: introduction**
Week 2	Lab 2: Generating reports on key performance indicators.
Week 3	Lab 3: Utilizing technology to streamline healthcare operations.
Week 4	Lab 4: Implementing telehealth services for remote consultations.
Week 5	Lab 5: Managing change during system implementation.
Week 6	Lab 6: Continuous system optimization and user training.
Week 7	Lab 7: Overcoming challenges and adapting to new technologies.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	"Health Information Management: Concepts, Principles, and Practice" by Katherine McNeill and Mervat Abdelhak	Yes
Recommended Texts	"Implementing and optimizing electronic health records in hospitals: a systematic review" by Health Policy and Technology	No
Websites	Healthcare Information and Management Systems Society (HIMSS): Offers resources, events, and research on healthcare IT and management systems.	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings

	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Web Development			**Module Delivery**	
Module Type	**IMS301**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Core**				
ECTS Credits	**5**				
SWL (hr/sem)	**150**				
Module Level			**Semester of Delivery**		
Administering Department			**College**		
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMS203	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introduce students to the basics of web development (HTML, CSS, JavaScript). 2. Enable students to design and develop static and simple dynamic websites. 3. Train students in frontend development, version control, and simple backend concepts. 4. Provide practical experience with tools like Git, Node.js, and MongoDB. 5. Prepare students for full-stack development and deployment practices.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Understand web development concepts and the role of frontend & backend. - Develop static websites using HTML and CSS. - Apply JavaScript for interactivity and DOM manipulation. - Use Git & GitHub for version control. - Create a basic full-stack project (Node.js + MongoDB). - Deploy a website to a hosting platform.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Lectures for theoretical concepts. - Practical coding sessions and labs. - Quizzes and assignments after each topic. - Mini-projects and team work. - Final project presentation.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes				
	Assignments				
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam				
	Final Exam				
Total assessment					

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Web Development
Week 2	HTML Basics
Week 3	HTML Intermediate
Week 4	CSS Basics
Week 5	CSS Layout
Week 6	CSS Advanced (Flexbox & Grid)
Week 7	Introduction to JavaScript
Week 8	JavaScript Control Flow
Week 9	JavaScript DOM Manipulation
Week 10	JavaScript Advanced (Arrays, Objects, ES6)
Week 11	Version Control with Git & GitHub
Week 12	Introduction to Backend with Node.js
Week 13	Database Basics (MongoDB)
Week 14	Full-Stack Mini Project
Week 15	Deployment & Next Steps

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to HTML & basic webpage structure
Week 2	HTML tags, images, links, and forms
Week 3	HTML tables & semantic tags
Week 4	CSS basics – inline, internal, external styles
Week 5	CSS box model & positioning
Week 6	CSS Flexbox & Grid practical exercises
Week 7	JavaScript basics – variables, operators
Week 8	JavaScript control flow – conditions, loops
Week 9	DOM manipulation – selecting & modifying elements
Week 10	JavaScript arrays, objects, ES6 features
Week 11	Git & GitHub – creating repos, commits, pushes
Week 12	Node.js introduction – running JS on server
Week 13	MongoDB basics – inserting & querying data
Week 14	Full-stack mini project lab (frontend + backend integration)
Week 15	Deployment lab – hosting project online

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Jon Duckett. HTML and CSS: Design and Build Websites. Wiley, 2011.	
Recommended Texts	1. Marijn Haverbeke. Eloquent JavaScript, 3rd Edition. No Starch Press, 2018. 2. MDN Web Docs (https://developer.mozilla.org) 3. Node.js & MongoDB Official Documentation	
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**

Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information معلومات المادة الدراسية					
Module Title	**Artificial Intelligence**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS302**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	IMS		**College**	CSIT	
Module Leader	Garineh S. Ohannesian		**e-mail**	garineh.sarkies@uobasrah.edu.iq	
Module Leader's Acad. Title	Asst. Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	**1.0**	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	IMS312	**Semester**	6

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives **أهداف المادة الدراسية**	**1.** To introduce students to the fundamental concepts of Artificial Intelligence (AI) and its applications. **2.** To provide knowledge of core AI techniques, including knowledge representation, search algorithms, expert systems, and optimization. **3.** To develop practical understanding of problem-solving using AI methods such as blind and informed search, shortest path algorithms, and genetic algorithms. **4.** To introduce the relationship between AI and Machine Learning, preparing students for advanced study in ML.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	**By the end of this module, students will be able to:** **1.** Define Artificial Intelligence, explain its history, and differentiate between classical and modern AI. **2.** Identify and describe the main branches and applications of AI in real-world domains. **3.** Explain and apply basic knowledge representation techniques (logic, rules, semantic approaches). **4.** Describe the structure, components, and applications of expert systems. **5.** Apply blind search algorithms (BFS, DFS) and compare their efficiency. **6.** Implement heuristic-based informed search algorithms, including Best First Search and A*. **7.** Understand and apply shortest path concepts and problems such as the Traveling Salesman Problem (TSP). **8.** Explain the role of optimization in AI and identify simple methods and applications. **9.** Understand the principles of genetic algorithms and their steps in problem-solving. **10.** Explain the relationship between AI and Machine Learning and identify basic ML types and applications.
Indicative Contents **المحتويات الإرشادية**	**1. Introduction to AI** • Definition of Artificial Intelligence • History and Evolution of AI • AI Properties • Classic AI vs. Modern AI • Key Branches of AI • Human Intelligence vs. Artificial Intelligence

2. Knowledge Representation

- Definition of Knowledge Representation
- Importance in AI
- Common Techniques of Knowledge Representation

3. Expert Systems: Concepts and Applications

- Definition of Expert Systems
- Components of an Expert System
- How It Works (Step-by-step process of decision making)
- Examples and Applications of Expert Systems

4. Problem Solving through Search in AI

- What is search in AI?
- State space representation.
- Problem formulation.
- Role of search algorithms in problem solving.
- Types of Search Algorithms.

5. Blind Search – Breadth First Search (BFS)

- Concept of blind/uninformed search.
- BFS algorithm explanation.
- Example: solving a simple puzzle or tree.
- Advantages & disadvantages.

6. Blind Search – Depth First Search (DFS)

- DFS algorithm explanation.
- Example with search tree.
- Advantages & disadvantages.
- Comparison BFS vs DFS.

7. Informed Search – Best First Search

- Introduction to heuristic search.
- Best First Search algorithm.
- Example using heuristic function.

8. Informed Search – A* Algorithm

- A* algorithm explanation.
- Step-by-Step Algorithm
- Example: shortest path in a weighted graph.
- Advantages over Best First Search.

	9. Shortest Path Algorithms & Applications • Concept of shortest path in AI. • Traveling Salesman Problem (TSP): definition and importance. • Example of solving TSP using simple heuristics. • Applications in real-world routing and navigation. **10. Optimization in AI** • What is Optimization? • Feasible vs. Optimal Solution • Why Optimization is Important in AI? • Examples in AI • Methods (Simple Overview) **11. Genetic Algorithms** • Introduction to evolutionary computation. • Steps of Genetic Algorithm. • Example application. **12. Introduction to Learning Approaches in AI** • What is Machine Learning? • Relation between AI and ML. • Types of ML (brief: supervised, unsupervised, reinforcement). • Applications of ML in AI systems.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• **Lectures:** Present core AI concepts clearly using slides, diagrams, and examples. Emphasis is on understanding principles, definitions, and algorithms. • **Discussions:** Encourage questions, class participation, and group discussions to reinforce theoretical understanding and critical thinking. • **Case Studies & Examples:** Use real-world scenarios and simplified examples to illustrate AI applications and problem-solving approaches. • **Self-Study:** Guide students to read recommended textbooks, research articles, and online resources to deepen their knowledge and support independent learning. • **Interactive Q&A Sessions:** Occasional review sessions for students to clarify doubts and consolidate learning.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**47**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**3**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**78**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (15)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (15)	2, 12	LO # 3, 4, 6 and 7
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-12
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Introduction to AI
Week 2	Knowledge Representation
Week 3	Expert Systems: Concepts and Applications
Week 4	Problem Solving through Search in AI
Week 5	Blind Search – Breadth First Search (BFS)
Week 6	Blind Search –Depth First Search (DFS)
Week 7	Mid-term Exam
Week 8	Informed Search – Best First Search and A* Algorithm
Week 9	Informed Search – Best First Search and A* Algorithm (continued)
Week 10	Shortest Path Algorithms & Applications

Week 11	Optimization in AI
Week 12	Genetic Algorithms
Week 13	Genetic Algorithms (continued)
Week 14	Introduction to Learning Approaches in AI
Week 15	Student Projects Presentations

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Artificial Intelligence: A Modern Approach" – Stuart Russell & Peter Norvig	No
Recommended Texts	Introduction to Artificial Intelligence, Wolfgang Ertel	No
Websites	https://ai.stanford.edu/(Academic articles, research papers, and lecture notes on AI concepts)	

Grading Scheme

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Networks**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS303**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	5	
Administering Department	IMS		**College**		
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMS105	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Build an understanding of the fundamental concepts of computer networking. 2. Familiarize the student with the basic taxonomy and terminology of the computer networking area. 3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking. 4. Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks. 5. explain the means and methods contained in the computer network, where the course deals with explaining the means of communication and indicating their quality and efficiency, 6. knowing how to develop the methods of improving the network performance and the factors affecting on the network
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. This course is to provide students with an overview of the concepts and fundamentals of data communications and computer networks. 2. Explain data communication concepts and techniques in a layered network architecture. 3. Recognition on communications switching and routing, types of communication, network congestion, network topologies, network configuration and Management. 4. Explaining in detail about the layered network models (OSI reference model, TCP/IP networking architecture) and their protocols, 5. Types of networks (LAN, MAN, WAN and Wireless networks) and their protocols.
Indicative Contents المحتويات الإرشادية	The module includes four main requirements that the student must complete in order to successfully pass the course. **1. Readings:** Students must weekly read each lecture before presenting it in the classroom in order to be able to interact and discuss. The content of the course includes two main parts, and each part includes a group of sections whose topics are illustrated in weekly syllabus, which includes: **PART ONE:** Introduction to Networking (Data Communication), Network Models, Categories of Networks, Network Classification, Network topologies: THE INTERNET A Brief History, The Internet Today, Protocols and standards, OSI model TCP/IP Protocol Suite, Addressing **PART TWO:** Subnetting, Transmission Impairment, Data Rate Limits, Transmission Media, Guided Media, Unguided Media(wireless), Digital Transmission, Analog Transmission, Bandwidth Utilization, Error Detection, Correction & Multiple Access, UDP, TCP, DNS, Remote Logging, EMail, FTP ,WWW and HTTP **2. Discussion:** We will use discussion as the main form of interaction in the class.

	Students' responses to the weekly readings, their individual assignments, and their thoughtful responses to their classmates' posts show their level of understanding. Their active participation in the discussions is the best way to get the most out of the course! **3. Oral Presentations:** The purpose of this assignment is to allow students to explore a topic in more detail for each lecture and to share the results with their classmates. Each student is required to submit a short report in slideshow format (10 slides not including title and reference slides) on a topic relevant to one of the course lecture. The proposed topics are presented in the classroom, but the student can choose other related topics (but after the approval of the teacher). Presentations should be based on scientific sources of information (be sure to include an appropriate list of references). And we should delve deeper into an interesting topic for each section. Try to use non-text materials in your presentation (videos or online examples, tables, charts, and graphs) as a way to group and present the main ideas and themes. If some text is necessary, please limit it to very short paragraphs and bulleted lists. Although not a requirement, all presentations will be posted to Google Classroom and a resource for other class participants. The student is expected to answer the questions of his classmates. **4. Project:** This assignment requires the submission of a project by a group of students within a team work that employs all the theoretical concepts studied in the theoretical lectures, SQL topics, and advanced experience in dealing with complex SQL expressions to design and implement an EHR system in the real world.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in the delivery of this module is to encourage students to participate in discussions, while improving and expanding their critical thinking skills. This will be achieved through discussions during the weekly lectures and after the oral presentations by answering the questions of their colleagues. Enhancing the principle of teamwork by participating in the implementation of the EHR system implementation project.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4,10	LO #1,2,3 and 12
	Project Assignment	2	10% (10)	12	LO # 13,14 and 15
	Lab. Assignment	1	10% (10)	Continuous	LO # 13, 14 and 15
	Seminar	1	10% (10)	The student chooses the week and the topics	All
Summative assessment	**Midterm Exam**	3hr	10% (10)	7	LO # 1-8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

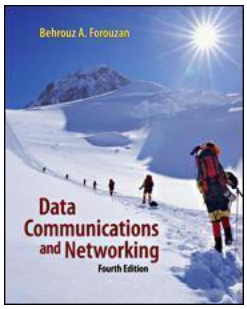
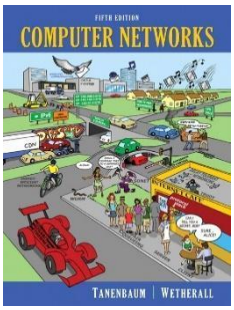
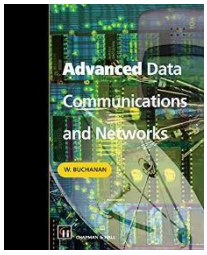
Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Networking) Data Communication
Week 2	Network (Distributed Processing, Network Criteria, Physical Structures, Network Components: NIC, Repeater HUB, Bridge, Router, GATEWAY
Week 3	Network Models, Categories of Networks, Network Classification, LAN, MAN and WAN Network topologies:
Week 4	THE INTERNET A Brief History, The Internet Today, PROTOCOLS AND STANDARD
Week 5	Network Models 2.1 LAYERED TASKS Sender, Receiver, and Carrier, Hierarchy - 2.2 THE OSI MODEL
Week 6	TCP/IP Protocol Suite, Addressing

Week 7	**Midterm Exam**
Week 8	Subnetting
Week 9	Transmission Impairment, Data Rate Limits
Week 10	Transmission Media, Guided Media, Unguided Media(wireless)
Week 11	Digital Transmission
Week 12	Analog Transmission, Bandwidth Utilization
Week 13	Error Detection, Correction & Multiple Access
Week 14	UDP, TCP, DNS, Remote Logging, EMail, FTP
Week 15	WWW and HTTP

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	introduction to cisco packet tracer + install the program
Week 3-4	Create Simple Networks on packet tracer
Week 5-6	Create 2 different network and connect them
Week 7	Set (host name, enable password, Ip& subnet mask, save)
Week 8	Assign vlan protocol &trunk vlan
Week 9	Implement Telnet &SSH protocols
Week 10	Implement port security
Week 11	Implement port security + vlan protocols
Week 12	Implement vtp + vlsm ip
Week 13-14	Inter-VLAN Routing (Router on a Stick)
Week 15	Implement cisco discovery protocol

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Data communication and networking: Book by Behrouz A.	Yes

	Forouzan,4th edition  COMPUTER NETWORKS", 5th edition, ANDREW S. TANENBAUM, DAVID J. WETHERALL, PRENTICE HALL, 2011 	
Recommended Texts	• Advanced Data Communications and Networks: First Edition, Bill Buchanan 	No
Recommended Websites	https://en.wikipedia.org/wiki/Computer_networking https://www.udemy.com/course/introduction-to-networking-for-complete-beginners/?utm_source=aff-campaign&utm_medium=udemyads&LSNPUBID=bt30QTxEyjA&ranMID=47901&ranEAID=bt30QTxEyjA&ranSiteID=bt30QTxEyjA-Q6iiO48YOK3piuI769KNfw https://www.coursera.org/learn/computer-networking?irclickid=1LHxmUSupxyNWT%3AQ-OUPCU2lUkF0GJV1D3MoSE0&irgwc=1&utm_medium=partners&utm_source=impact&utm_campaign=1359419&utm_content=b2c	

Grading Scheme

مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Software Engineering**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS304**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level			**Semester of Delivery**		
Administering Department			**College**		
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMS205	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	- To provide students with fundamental knowledge of software engineering principles and practices. - To enable students to understand the software development life cycle (SDLC) and apply appropriate methodologies. - To develop students' skills in requirements engineering, software design, modeling, testing, and project management. - To foster teamwork, ethical awareness, and quality-oriented thinking in software projects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to: 1. Explain the phases of the software development life cycle (SDLC). 2. Apply requirements engineering techniques to specify functional and non-functional requirements. 3. Design software architectures and use UML modeling for system representation. 4. Compare and apply software development methodologies (Waterfall, Agile, etc.). 5. Apply testing strategies and quality assurance techniques. 6. Demonstrate teamwork, project planning, and ethical practices in software engineering projects.
Indicative Contents المحتويات الإرشادية	- Introduction to Software Engineering - Software Process Models - Software Project Management - Requirements Engineering - Software Design Principles - Software Modeling and UML - Implementation and Version Control - Software Testing and Debugging - Software Maintenance and Evolution - Software Quality Assurance - Emerging Trends in Software Engineering - Case Studies and Course Review

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes				
	Assignments				
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam				
	Final Exam				
Total assessment					

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Software Engineering – Software definition, SE vs programming, SDLC, Software crisis, Quality attributes.
Week 2	Software Process Models – Waterfall, Incremental, Spiral, V-model, Agile (Scrum, XP, Kanban).
Week 3	Software Project Management – Planning, Effort estimation (COCOMO), Scheduling, Risk management, Configuration management.
Week 4	Requirements Engineering – Functional vs non-functional requirements, elicitation, analysis, use cases, validation.
Week 5	Software Design – Architecture, design principles, styles, design patterns.
Week 6	Software Modeling and UML – UML diagrams: class, use case, sequence, activity, state.
Week 7	Midterm Exam.
Week 8	Software Implementation – Coding standards, documentation, refactoring, Git, CI.
Week 9	Software Testing Fundamentals – V&V, testing levels, testing methods, test case design.
Week 10	Advanced Testing and Debugging – Test automation, regression, performance, security testing,

	debugging.
Week 11	Software Maintenance and Evolution – Maintenance types, legacy systems, reengineering, reverse engineering.
Week 12	Software Quality Assurance – SQA standards (ISO/IEC, CMMI), metrics, code review, reliability.
Week 13	Emerging Trends – Cloud computing, SaaS, microservices, AI-assisted SE, ethics.
Week 14	Course Review and Discussion – Summary, case studies, project presentations.
Week 15	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Software Engineering – Software definition, SE vs programming, SDLC, Software crisis, Quality attributes.
Week 2	Software Process Models – Waterfall, Incremental, Spiral, V-model, Agile (Scrum, XP, Kanban).
Week 3	Software Project Management – Planning, Effort estimation (COCOMO), Scheduling, Risk management, Configuration management.
Week 4	Requirements Engineering – Functional vs non-functional requirements, elicitation, analysis, use cases, validation.
Week 5	Software Design – Architecture, design principles, styles, design patterns.
Week 6	Software Modeling and UML – UML diagrams: class, use case, sequence, activity, state.
Week 7	Midterm Exam.
Week 8	Software Implementation – Coding standards, documentation, refactoring, Git, CI.
Week 9	Software Testing Fundamentals – V&V, testing levels, testing methods, test case design.
Week 10	Advanced Testing and Debugging – Test automation, regression, performance, security testing, debugging.
Week 11	Software Maintenance and Evolution – Maintenance types, legacy systems, reengineering, reverse engineering.
Week 12	Software Quality Assurance – SQA standards (ISO/IEC, CMMI), metrics, code review, reliability.
Week 13	Emerging Trends – Cloud computing, SaaS, microservices, AI-assisted SE, ethics.
Week 14	Course Review and Discussion – Summary, case studies, project presentations.
Week 15	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Required Text: Roger S. Pressman & Bruce R. Maxim (2019). Software Engineering: A Practitioner's Approach (9th Edition). McGraw-Hill.	
Recommended Texts	Ian Sommerville (2015). Software Engineering (10th Edition). Pearson.	
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Medical Image Processing**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS305**				
ECTS Credits	**5**				
SWL (hr/sem)	**150**				
Module Level	UG II / UG III (suitable for 2nd–3rd year undergraduate)		**Semester of Delivery**	5	
Administering Department	IMS		**College**	CSIT	
Module Leader	Ali Z. Sharhan & Ansam kadhum		**e-mail**	ali.zamil@uobasrah.edu.iq ansam.abdulhadi@uobasrah.edu.iq	
Module Leader's Acad. Title	Asst. Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor	Name		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	18/09/2025		**Version Number**	1.1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This module teaches fundamental theory and classical techniques of two- and three-dimensional digital image processing with emphasis on medical imaging examples. Students will learn to preprocess, enhance, segment, register,

	reconstruct, visualize, and quantitatively analyze medical images (DICOM/stack data) using reproducible, algorithmic methods implemented in Python or MATLAB.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain principles and clinical characteristics of major medical imaging modalities (X-ray, CT, MRI, Ultrasound, PET) and describe the DICOM image format. 2. Apply spatial and frequency-domain enhancement and denoising techniques to medical images and quantify their effects (SNR, PSNR). 3. Implement classical segmentation methods (thresholding, region growing, watershed, morphological methods, active contours) and perform robust post-processing. 4. Perform rigid and affine registration and evaluate registration accuracy. 5. Reconstruct 3D volumes from 2D slices and perform basic 3D visualization and measurement. 6. Compute quantitative measurements (area, perimeter, volume, shape descriptors, basic texture measures) and interpret their clinical relevance. 7. Produce well-documented, reproducible code and concise technical reports for laboratory and project work. 8. Apply ethical, privacy, and data-governance best practices when handling clinical imaging data (DICOM anonymization, provenance). 9. Integrate multiple processing steps in a non-AI, clinically motivated project and present results clearly to technical and non-technical audiences.
Indicative Contents المحتويات الإرشادية	**Part A — Core Image Processing & Medical Imaging** • Introduction to imaging systems, modalities, medical use cases, and DICOM. • Digital image fundamentals: sampling, quantization, image types (binary, grayscale, color, multispectral). • Spatial domain processing: point operations, intensity transforms, histogram methods. • Frequency domain: DFT, DCT, basic filtering, wavelet overview. • Image enhancement and restoration: smoothing, sharpening, deblurring basics. • Image compression concepts (lossless / lossy) and applications in medicine. **Part B — Analysis, Segmentation, Registration & 3D** • Statistical noise models (Gaussian, Poisson, speckle) and classical denoising filters (median, Wiener, bilateral). • Morphological operations, connected components, size filtering. • Classical segmentation: thresholding (global/local/Otsu), region growing, watershed, active contours. • Registration: rigid and affine transforms, interpolation/resampling, basic similarity measures. • Feature extraction: intensity statistics, shape descriptors, GLCM basics for texture.

	• 3D reconstruction (stacking, interpolation), surface extraction (marching cubes concept), and volume measurement. • Validation metrics: Dice, IoU, sensitivity, specificity; simple reporting practices.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Lectures to introduce theoretical concepts and clinical context. • Weekly hands-on labs (Jupyter Notebooks / guided code) for practical skills. • Short formative quizzes and in-class problem solving. • A supervised team project (non-AI) applying pipeline methods to a small curated dataset. • Independent study guided by lab exercises and reading. (Teaching strategies follow the structure of the uploaded module form and emphasize practical application and reproducibility.)

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes & Short Assignments (formative)**	3	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Laboratory Reports (individual)	10	10%	Weeks 5, 9, 12	LO #1, LO #2, LO #3
	Midterm Exam (theory + short programming)	1 (2hr)	30%	Continuous	LO #2, LO #3, LO #6, LO #7
	Final Project (team)- code + report + presentation	1	15%	Week 8	LO #1–LO #4

Summative assessment	**Final Exam (comprehensive)**	1 (3hr)	30%	Presentation Week 15	LO #3, LO #5, LO #6, LO #7, LO #9
	Final Exam	—	15%	Exam period	All LOs
Total assessment			100%	—	—

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction — medical imaging modalities, clinical use cases, DICOM basics.
Week 2	Digital image representation — sampling, quantization, histograms, intensity transforms.
Week 3	Spatial filters & enhancement — smoothing, sharpening, CLAHE, contrast adjustment.
Week 4	Noise models & classical denoising — Gaussian, Poisson, speckle; median, Wiener, bilateral filters.
Week 5	Frequency-domain methods — DFT, DCT, frequency filtering, wavelet overview.
Week 6	Morphological processing — erosion/dilation, open/close, connected components.
Week 7	Segmentation I — thresholding (global/local/Otsu), region growing; morphological cleanup.
Week 8	**Midterm Exam** (theory + short programming tasks)
Week 9	Segmentation II — watershed, active contours (classical formulation), parameter tuning.
Week 10	Registration fundamentals — rigid/affine transforms, interpolation, similarity measures (SSD, NCC conceptually).
Week 11	Feature extraction & quantitative analysis — area, perimeter, compactness, GLCM basics.
Week 12	3D reconstruction — stacking slices, voxel concept, interpolation.
Week 13	3D visualization & measurement — marching cubes concept, volume computation from segmented regions.
Week 14	Validation & evaluation — Dice, IoU, sensitivity/specificity; ethics & data governance session.
Week 15	Final project presentations; course wrap-up and feedback.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**(Lab 1):** Environment & DICOM I/O — Python/Jupyter, pydicom / SimpleITK; load and anonymize a DICOM series.
Week 2	**(Lab 2):** Intensity operations & histograms — contrast stretching, histogram equalization, CLAHE; compute SNR/PSNR.
Week 3	**(Lab 3):** Noise simulation & denoising — add noise types, median/Wiener/bilateral filtering, compare metrics.
Week 4	**(Lab 4):** Morphological processing & connected components — label objects and size filtering.
Week 5	**(Lab 5):** Segmentation I — thresholding, Otsu, region growing, morphological cleanup.
Week 6	**(Lab 6):** Segmentation II — watershed & classical active contour experiment; parameter study.
Week 7	**(Lab 7):** Registration I — rigid registration experiments and error measurement.
Week 8	**(Lab 8):** Feature extraction — compute area, perimeter, centroid, compactness, basic GLCM features.
Week 9	**(Lab 9):** 3D stacking & volume measurement — create volume from slices and compute segmented volume.
Week 10	**(Lab10):** Project clinic & reproducibility — prepare final repo, README, reproducibility checklist, and presentation materials.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Gonzalez, R. C., & Woods, R. E., *Digital Image Processing* (Pearson). 2. Dougherty, G., *Digital Image Processing for Medical Applications* (Cambridge). 3. Sinha, G. R., et al., *Medical Image Processing: Concepts and Applications* (Prentice Hall) — optional.	Yes (E-copy)
Recommended Texts	**لا يوجد**	
Websites	**Online:** SimpleITK, pydicom, scikit-image, and OpenCV documentation and tutorials (instructor will provide curated links).	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Geographical Information Systems**			**Module Delivery**	
Module Type	**Elective learning activity**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS306**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	IMS		**College**		
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Understand the scope of medical and health geography and how the discipline relates to the fields of medicine, public health, and environmental health; 2. Implement a variety of common statistical and computational methods used to understand the geography of health; and 3. Produce high quality, professional maps that communicate a variety of health and medical topics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Collect and organise spatial data on disease and its ecological determinants (e.g. climate, land-use and poverty) using appropriate tools, including Global Positioning Systems, Geographic Information Systems platforms (qGIS) and R statistical software; 2. Apply basic statistical techniques to analyse the spatial patterns of infection and disease; 3. Appreciate the relative merits of alternative spatial statistical approaches for exploring and predicting spatial distributions of infection and disease; 4. Demonstrate an understanding of how the output of these analyses can be integrated into a rational disease control programme; 5. Critically read and assess relevant literature.
Indicative Contents المحتويات الإرشادية	**<u>The module is expected to cover the following topics:</u>** • Collection and organisation of spatial data using Global Positioning Systems, Geographic Information Systems, and Remote Sensing; (10 hrs) • Exploring spatial patterns of infection and disease, using a range of spatial analytical methods; (10 hrs) • Spatial prediction of infection and disease, using alternative statistical modeling approaches; (10 hrs) • Critical review of spatial epidemiological literature; (10 hrs) • Integration of spatial data collection and analysis into a rational disease control programs (10 hrs). **Contact time (including through remote platforms):-** This time includes activities that take place in face-to-face contexts such as lectures, seminars, demonstrations, tutorials, supervised laboratory workshops, practical classes, project supervision as well as where tutors are available for one-to-one discussions and interaction by email. **Self-directed learning:-** Involved obtaining information on adding up to at least seven hours where more than half of the person's total motivation is to gain and retain certain fairly clear knowledge and skill, or to produce some other lasting change.

	Review, Reflect, and Revise:- During the "Review, Reflect, and Revise" step, students engage in an improvement cycle where they consider how they can improve both the process and product of their learning. They review by looking for opportunities to make improvements, they reflect by thinking carefully about potential changes to be more effective, and they revise by adjusting both their process and product of learning as needed to improve their practices and outcomes.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module will be achieved through encouraging the students to designs several specific engineering projects according to the teaching content and the actual situation of students and the project will run through all aspects of the whole teaching activities, while mastering the basic theory, further improve the engineering practice ability and innovation ability of students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11

assessment	**Assignments**	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	3 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Map Anatomy** – Maps' Types – Map Scale's Types – Reference surfaces for mapping – Coordinate systems – Map projections – Coordinate transformations – Map Abstraction
Week 2 &3	**GIS and Spatial Data** – Models and representations of the real world – Geographic phenomena – Computer representations of geographic information – Hardware and software trends – GIS software – GIS architecture and functionality – Spatial Data Infrastructure (SDI) – Stages of spatial data handling – Spatial data capture and preparation – Spatial data storage and maintenance – Spatial query and analysis – Spatial data presentation – Database management systems
Week 4	**Spatial Databases for Public Health** - Why Spatial Data in Public Health? - Why Statistical Methods for Spatial Data? - Components of Spatial Data - An Odyssey into Geodesy, - Sources of Spatial Data
Week 5,6	**Data Models for GIS** - Raster Data Models - Vector Data Models
Week 7,8	**Data entry and preparation** - Spatial data input - Data quality - Observational vs. Experimental Data - Risk - Modeling Counts and Rates - Challenges in the Analysis of Observational Data - Data checks and repairs

	- combining data from multiple sources - interpolating discrete data - interpolating continuous data
Week 9	- **Mid-term Exam**
Week 10,11	**Visualizing Spatial Data** - Types of Statistical Maps - Modifiable Areal Unit Problem - Visualization - Additional Types of Maps - Exploratory Spatial Data Analysis
Week 12,13,14	**Data entry and preparation** - Spatial data input - Data quality - Observational vs. Experimental Data - Risk - Modeling Counts and Rates - Challenges in the Analysis of Observational Data - Data checks and repairs - combining data from multiple sources - interpolating discrete data - interpolating continuous data
Week 15	**Course Review**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	RINT ITEM Pfeiffer, DU, Robinson, TP, Stevenson, M, et al. Spatial analysis in epidemiology. Oxford: Oxford University Press; 2008. This text book forms an excellent introduction and reference throughout the course	No
Recommended Texts	– Applied Spatial Statistics for Public Health Data by LANCE A. WALLER and CAROL A. GOTWAY, 2004. – GIS and Public Health, by Ellen K. Cromley and Sara L. McLafferty, Second Edition, 2011 – Geographic Information Systems, V. 1.0	No
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electronic Health Records**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS307**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**3**		**Semester of Delivery**	**5**	
Administering Department	IMS		**College**	CSIT	
Module Leader	Ansam Kadhum		**e-mail**	ansam.abdulhadi@uobasrah.edu.iq	
Module Leader's Acad. Title	Ass.teacher		**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	**01/06/2025**		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMS104 , IMS208	**Semester**	
Co-requisites module	**None**	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module aims to introduce electronic health records (EHRs) in terms of contents, usefulness and application, with a strong focus on the role of electronic health record systems in healthcare operations. The main objectives of this module are: 1. Deep understanding of the role of EHR in ensuring quality of care and evidence-based practice. 2. Understanding of how EHRs are applied in clinical practice. 3. Study the concepts and methods of project management to implement EHR systems. 4. Identify the clinical processes and study workflow and tools and standards for the management of it. 5. Analyze EHR workflow and how to manage and adapt to changes. 6. Design EHR system and follow up on its implementation. 7. Employ SQL language to design and implement an EHR system and deal with complex queries.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the basic concepts of EHRs since their inception and the benefits they provide to countries that adopt them, legally adopting them until reaching future developments. 2. Recognize EHRs work in healthcare, and what infrastructure and supporting technologies need to be implemented. 3. Understanding various terms and Informatics Standards associated with EHRs. 4. Understanding of the underlying clinical and business/administrative processes that the systems are intended to support. 5. Addresses how students can identify and analyze important business/administrative processes and then use this information to evaluate and implement an appropriate supporting clinical information system. 6. A discussion of the clinical process re-engineering and show how the computer may be used to support advanced business. 7. A discussion of basic terms and concepts is presented along with a case-study example. 8. Study how to improve education, understanding, involvement and support of physicians while also optimizing the choice and implementation of the HER. 9. Explanation of the most important legal issues related to the use of the electronic health record 10. Determine acceptable media for storing patient records, the validity of electronic signatures, and ensure the accuracy and reliability of patient records. 11. Discuss ways to maintain the confidentiality and security of computer

	accessible patient records, ownership of patient data, and contracting with vendors 12. Identify the planning steps to build a successful EHR system and follow up on its implementation. 13. Identification of the clinical processes and study of workflow and tools and standards for the management of workflow 14. Study the concepts and methods of project management to implement EHR systems. 15. Study how design and implement a real EHR system with advanced experience in dealing with complex SQL query 16. Provide general advice on protecting EHR installation, data integrity and prevention of loss.
Indicative Contents المحتويات الإرشادية	The module includes four main requirements that the student must complete in order to successfully pass the course. 1. **Readings:** Students must weekly read each lecture before presenting it in the classroom in order to be able to interact and discuss. The content of the course includes two main parts, and each part includes a group of sections whose topics are illustrated in weekly syllabus, which includes: **PART ONE: Electronic Health Records for Clinicians and Administrators** -SECTION I: Infrastructure and Supporting Technologies [8 hrs] - SECTION II: Understanding Processes and Outcomes [6 hrs] - SECTION III: Legal and Regulatory Issues [2 hrs] **PART TWO: Electronic Health Records Selection and Implementation** - SECTION IV: Electronic Health Records Selection [6 hrs] - SECTION V: Electronic Health Records Implementation [6 hrs] **2. Discussion:** We will use discussion as the main form of interaction in the class. Students' responses to the weekly readings, their individual assignments, and their thoughtful responses to their classmates' posts show their level of understanding. Their active participation in the discussions is the best way to get the most out of the course! **3. Oral Presentations:** The purpose of this assignment is to allow students to explore a topic in more detail for each lecture and to share the results with their classmates. Each student is required to submit a short report in slideshow format (10 slides not including title and reference slides) on a topic relevant to one of the course lectures. The proposed topics are presented in the classroom, but the student can choose other related topics (but after the approval of the teacher). Presentations should be based on scientific sources

	of information (be sure to include an appropriate list of references). And we should delve deeper into an interesting topic for each section. Try to use non-text materials in your presentation (videos or online examples, tables, charts, and graphs) as a way to group and present the main ideas and themes. If 4 some text is necessary, please limit it to very short paragraphs and bulleted lists. Although not a requirement, all presentations will be posted to Google Classroom and a resource for other class participants. The student is expected to answer the questions of his classmates. **4. Project:** This assignment requires the submission of a project by a group of students within a team that employs all the theoretical concepts studied in the theoretical lectures, SQL topics, and advanced experience in dealing with complex SQL expressions to design and implement an EHR system in the real world.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in the delivery of this module is to encourage students to participate in discussions, while improving and expanding their critical thinking skills. This will be achieved through discussions during the weekly lectures and after the oral presentations by answering the questions of their colleagues. Enhancing the principle of teamwork by participating in the implementation of the EHR system implementation project.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**64**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**61**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسية				
	Time/Nu	**Weight (Marks)**	**Week Due**	**Relevant Learning**

		mber			Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	#1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	#3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuou s	All
	Report	1	10% (10)	13	#5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	#1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Electronic Health Records (EHR): Definition, history, terminology, advantages and disadvantages.
Week 2	Infrastructure and supporting technologies: Hardware, OS, Networks, Databases, Data Repositories.
Week 3	Adoption of EHR: reasons, comparison with paper-based records, difference between EHR and EMR.
Week 4	Health Informatics Standards: HL7, ICD-10, SNOMED CT, FHIR, HIPAA.
Week 5	Types of EHR Systems: On-Premises, Cloud, Web-Based, Mobile, Open-source, Integrated.
Week 6	Core Functions: Data entry, storage & retrieval, clinical decision support, order management, workflow, communication.
Week 7	Core Capabilities: Results management, clinical decision support, electronic communication, patient support, population health.
Week 8	Midterm Exam.
Week 9	Clinical and Administrative Processes: Understanding Business & Clinical Processes in healthcare institutions.
Week 10	Legal and Regulatory Issues: privacy, confidentiality, ownership, electronic signatures.
Week 11	Business Models in EHR: Commercial, Open Source, In-house.
Week 12	Project Management in EHR Implementation: Concepts, Workflow Redesign.
Week 13	Implementation in Practice: Data Migration, Training, Go-live.
Week 14	Benefits & Challenges: Quality improvement, efficiency, cost, change management, interoperability, security issues.

Week 15	**Security and Data Protection: HIPAA, data integrity, prevention of data loss.**
Week 16	**Review + Final Exam.**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Introduction to Lab: Overview of SQL + Cheat Sheet.**
Week 2	**Requirements Gathering + Installing SQL Server Management Studio (SSMS).**
Week 3	**System Design & Architecture + Creating Databases.**
Week 4	**Database Design: Tables, Primary Keys, Data Insertion.**
Week 5	**Handling Null values, Constraints, Keys.**
Week 6	**SQL Queries (Select, Where, Distinct, Like).**
Week 7	**Advanced Queries: Group By, Order By, Aggregate Functions.**
Week 8	**Midterm Lab Test.**
Week 9	**Joins: Inner, Left, Right, Union.**
Week 10	**Stored Procedures, Variables, Functions (Round, Cast, Convert).**
Week 11	**User Interface Design for EHR.**
Week 12	**Software Development and Coding for EHR.**
Week 13	**Deployment & Documentation.**
Week 14	**Hands-on Practice with Real Healthcare Dataset.**
Week 15	**Final Project Presentation.**
Week 16	**Lab Review + Project Discussion.**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Kelley, T. Electronic health records for quality nursi ng and health care. DEStech Publications, Inc. (201	**Yes**

	6). 2. Connolly, T., & Begg, C. Database Systems: A practi cal Approach to design, implementation, and mana gement. (2015). 3. Sayles, N. B. Health information management tech nology: An applied approach (p. 686). L. L. Gordon (Ed.). Chicago, USA: American Health Information Management Association. (2013). 4. Sinha, P. K., Sunder, G., Bendale, P., Mantri, M., & Dande, A. Electronic health record: standards, codi ng systems, frameworks, and infrastructures. John Wiley & Sons. (2012). 5. McCormick, K., & Gugerty, B. Healthcare informati on technology exam guide for CompTIA healthcare IT technician and HIT pro certifications. McGraw Hi ll Professional. (2012). 6. Hristidis, V. (Ed). Information discovery on electron ic health records. CRC Press. (2009). 7. World Health Organization. Electronic health recor ds: manual for developing countries. WHO Regiona l Office for the Western Pacific. (2006). 8. Carter, J.H. .Electronic health record: A guide for clinicians and administrators. Philadelphia: ACP Press. (ISBN 1930513976 9781930513976. 9. Elmasri, R. and Shamkant, B. N., "Fundamentals of Database Systems", 5th Edition Addison-Wesley	
Recommended Texts	• Practice Management and EHR: A Total Patient Encounter for Medisoft Clinical, FirstEdition, Susan M. Sanderson	No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors

	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Data Mining**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS308**				
ECTS Credits	**5**				
SWL (hr/sem)	**150**				
Module Level			**Semester of Delivery**		
Administering Department			**College**		
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMS211	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Familiarize students with the core principles of data mining (data preprocessing, classification, clustering, association analysis, prediction). 2. Enable students to extract meaningful patterns, trends, and knowledge from large datasets. 3. Provide hands-on practice in implementing algorithms using Python, R, Weka, or SQL-based systems. 4. Train students to design data-driven solutions for real-world problems (healthcare, business, social media). 5. Encourage students to critically evaluate algorithm performance, assess data quality, and select techniques appropriately.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Explain data mining concepts, processes, and applications. - Apply preprocessing techniques (cleaning, integration, normalization, transformation). - Implement algorithms for classification, clustering, association rule mining, and anomaly detection. - Evaluate models using performance metrics (confusion matrix, precision, recall, F1-score, ROC, AUC). - Use tools (Python/R/Weka/SQL) to analyze datasets and present results. - Develop projects applying data mining to real-world case studies.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Theoretical lectures to introduce data mining concepts. - Lab sessions with practical tools (Python, R, Weka). - Mini-projects (team of 2 students). - Quizzes at the end of each topic. - Midterm and final exams. - Final project presentation.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes				
	Assignments				
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam				
	Final Exam				
Total assessment					

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Data Mining – Concepts, tasks, applications (business, healthcare, social media).
Week 2-3	Data Preprocessing – Cleaning, integration, transformation, normalization, discretization.
Week 4-5	Association Rule Mining – Apriori, FP-growth, support, confidence, lift.
Week 6-7	Classification – Decision Trees (ID3, C4.5), Naïve Bayes, k-NN.
Week 8	Midterm Exam
Week 9-10	Clustering – k-Means, Hierarchical clustering, cluster evaluation (silhouette, SSE).
Week 11	Catch-up / Review
Week 12	Model Evaluation – Confusion Matrix, Precision, Recall, F1, ROC & AUC.
Week 13	Outlier Detection – Statistical, distance-based, density-based methods.
Week 14-15	Data Mining Applications & Project – Real-world case studies, project presentations.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Han, Jiawei, Kamber, Micheline, Pei, Jian. Data Mining: Concepts and Techniques, 3rd Edition, Morgan Kaufmann, 2011.	
Recommended Texts	1. Tan, Pang-Ning, Steinbach, Michael, Kumar, Vipin. Introduction to Data Mining, 2nd Edition, Pearson, 2019. 2. Witten, Ian H., Frank, Eibe, Hall, Mark A., Pal, Christopher. Data Mining: Practical Machine Learning Tools and Techniques, 4th Edition, Morgan Kaufmann, 2016.	
Websites	https://www-users.cse.umn.edu/~kumar001/dmbook/index.php	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Application Development**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS309**				
ECTS Credits	**5**				
SWL (hr/sem)	**150**				
Module Level			**Semester of Delivery**	5	
Administering Department	IMS		**College**	CSIT	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	18/09/2025		**Version Number**	1.1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMS204,IMS301,IMS304	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Familiarize students with advanced concepts in web applications development. 2. Train students to work with RESTful APIs and frontend frameworks. 3. Enable students to design and implement authentication and secure systems. 4. Provide hands-on experience with full-stack integration (React + Node.js + MongoDB).

	5. Develop skills for building real-time, secure, and deployable web applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Differentiate between static and dynamic web applications. - Apply advanced HTML5, CSS3, and JavaScript techniques. - Use RESTful APIs for frontend-backend communication. - Develop applications with React.js (components, state, hooks, routing). - Implement authentication, authorization, and security practices. - Build and deploy a full-stack web application with real-time communication .
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	- Lectures for theoretical concepts. - Practical coding sessions and labs. - Quizzes and assignments after each topic. - Mini-projects and team work. - Final project presentation.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes & Short Assignments (formative)**	3	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Laboratory Reports (individual)	10	10%	Weeks 5, 9, 12	LO #1, LO #2, LO #3
	Midterm Exam (theory + short programming)	1 (2hr)	30%	Continuous	LO #2, LO #3, LO #6, LO #7

	Final Project (team)- code + report + presentation	1	15%	Week 8	LO #1–LO #4
Summative assessment	**Final Exam (comprehensive)**	1 (3hr)	30%	Presentation Week 15	LO #3, LO #5, LO #6, LO #7, LO #9
	Final Exam	—	15%	Exam period	All LOs
Total assessment			100%	—	—

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Review of Web Development (HTML5, CSS3, JavaScript ES6) + Introduction to modern application architecture (Client/Server, APIs)
Week 2	RESTful APIs: Concepts, HTTP Methods, JSON, frontend-backend data handling.
Week 3	Introduction to React.js: Components, Props, State Management.
Week 4	Advanced React: Hooks (useState, useEffect), Routing, Forms handling.
Week 5	Advanced Backend with Node.js + Express: Building REST APIs, middleware.
Week 6	Advanced Database with MongoDB: relations, queries, aggregation.
Week 7	Application Security: Authentication (JWT, OAuth2), Authorization, XSS/CSRF protection.
Week 8	Integration of React + Express + MongoDB (MERN Stack).
Week 9	Mini Project: CRUD Application Development.
Week 10	Integration of React + Express + MongoDB (MERN Stack).
Week 11	WebSockets and Real-Time Applications (chat, notifications).
Week 12	Testing Applications (Unit & Integration Testing with Jest/Supertest).
Week 13	Deployment Strategies (Heroku / Vercel / Docker).
Week 14	Agile Methodologies & Git Workflow (Branches, Pull Requests).
Week 15	General Review + Final Project Presentations

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Review of HTML/CSS/JS through an interactive webpage.
Week 2	Consuming REST API using Fetch/Axios.
Week 3	Building simple React Components.
Week 4	State management in React + React Router usage.
Week 5	Building APIs with Express.js (GET, POST, PUT, DELETE).
Week 6	Integrating Express with MongoDB for CRUD operations.
Week 7	User authentication and registration using JWT.
Week 8	Full CRUD Application (React + Node + MongoDB).
Week 9	Chat Application using Socket.io.
Week 10	Code Testing with Jest.
Week 11	Deploying a test app on Heroku or Vercel.
Week 12	Final Project – Design Phase.
Week 13	Final Project – Development Phase.
Week 14	Final Project – Testing Phase.
Week 15	Final Project – Deployment & Presentation.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Flanagan, David. JavaScript: The Definitive Guide, 7th Edition. O'Reilly, 2020.	

Recommended Texts	1. Stoyan Stefanov. React Up and Running. O'Reilly, 2016. 2. Express.js & MongoDB Official Documentation. 3. React Official Docs (https://react.dev) 4. MDN Web Docs (https://developer.mozilla.org)	
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer vision**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS 310**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	IMS		**College**		
Module Leader			**e-mail**		
Module Leader's Acad. Title				MSc.	
Module Tutor	Name (if available)		**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMS305	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aims of this course are to introduce the principles, models and applications of computer vision, as well as some mechanisms used in biological visual systems that may inspire design of artificial ones. The course will cover: image formation, structure, and coding; edge and feature detection; texture, colour, stereo, motion; wavelet methods for visual coding and analysis; interpretation of surfaces, solids, and shapes; data fusion; probabilistic classifiers; visual inference and face recognition. 1. To clearly explain the lines and relation between digital image processing and computer vision from image analysis concepts. 2. Be able to decompose visual tasks into sequences of image analysis operations, representations, specific algorithms, and inference principles 3. To understand the relation among relevant topics of computer vision and image processing with artificial Intelligence (AI). 4. Be Able to analyze the robustness, brittleness, generalizability, and performance of different approaches in computer vision 5. Be Able to describe key aspects of how biological visual systems encode, analyze, and represent visual information 6. Be Able to think of ways in which biological visual strategies might be implemented in machine vision, despite the enormous differences in hardware 7. Understand in depth at least one important application domain, such as face recognition, detection, or interpretation
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. automated medical image analysis, interpretation, and diagnosis 2. OCR: recognition of printed or handwritten characters and words 3. smart offices: tracking of persons and objects; understanding gestures 4. biometric-based visual identification of persons 5. security monitoring and alerting; detection of anomaly 6. tracking of moving objects; collision avoidance; stereoscopic depth
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – computer vision Theory</u> Electromagnetic Spectrum and color. Color in Computer Vision, , Eigenvalues and Eigenvectors (SVD), Convolution and Correlation , Edge Detection for computer vision, Image Gradient, principles of Robotics, learning theory [15 hrs] Mathematical operations for extracting structure from images, Shift Theorem , Similarity Theorem, Convolution Theorem, Active contours (“snakes”). Fourier boundary descriptors. [15 hrs] Clustering and Segmentation, Features and Fitting, Feature Descriptors, The completeness of 2D Gabor wavelets , Face detection, recognition, classification and

	interpretation, Facial expression. [15 hrs]. Texture, color, shape , stereo, and motion descriptors, Intensity Gradient Models [15 hrs] Intelligent technique, Bayesian pattern classifiers, K-nearest neighbor's classifier, ANN, machine learning Revision problem classes [6 hrs] Part B – matlab and python program Fundamentals Matlab program, edge detection, segmentation. [15 hrs] Mathematical operations, matrices. [7 hrs] Feature extraction, Gabor wavelet, PCA, recognition and classification . [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem)	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب	4

الحمل الدراسي المنتظم للطالب خلال الفصل		أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (10)	5, 10	LO #1, 2, 10 and 11
	Projects / Lab.	1	15% (10)	Continuous	
	Report	1	5% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	3 hr	25% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Computer Vision
Week 2	Electromagnetic Spectrum and color. Color in Computer Vision
Week 3	Image restoration
Weeks 4 & 5	Edge Detection
Weeks 6 &7	Semantic Segmentation, clustering
Week 8 & 9	Features and Fitting

Week 10	Mid-term Exam
Weeks 11 & 12	Object recognition
Weeks 13 & 14	Motion and tracking approaches
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Lab 1: Introduction to matlab program
Week 3-4	Lab 2: Mathematical operations, matrices
Week 5-6	Lab 3: edge detection
Week 7-8	Lab 4: segmentation
Week 9-10	Lab 5: feature extraction
Week 11-12	Lab 6: face recognition
Week 13-14	Lab 7: motion and tracking

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	COMPUTERVISION:FOUNDATIONSANDAPPLICATIONS, COMPILEDBYRANJAYKRISHNA	
Recommended Texts		
Websites	https://www.cl.cam.ac.uk/teaching/0809/CompVision/CompVisNotes.pdf	

Grading Scheme

مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Simulation and Modeling in Medical Applications**			**Module Delivery**	
Module Type	**Basic**			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**IMS311**				
ECTS Credits	**5**				
SWL (hr/sem)	**150**				
Module Level			**Semester of Delivery**		
Administering Department			**College**		
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMS306	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introduce fundamental principles of modeling and simulation in healthcare. 2. Enable students to understand different types of models (discrete, continuous, hybrid) and their medical applications. 3. Train students to collect and utilize clinical/medical data as inputs for simulation studies. 4. Provide practical experience in building simulation models using modern tools (AnyLogic, MATLAB, Arena, Python). 5. Enhance student skills in interpreting simulation results for healthcare decision-making and policy support. 6. Encourage critical evaluation of models, verification, validation, and sensitivity analysis in medical contexts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Explain the role and significance of simulation in medical research and healthcare systems. - Classify and apply different types of simulation models. - Collect, preprocess, and use medical and clinical data for modeling. - Develop and implement simulation models in healthcare contexts (hospital flow, emergency departments, surgeries). - Conduct simulation experiments, analyze outputs, and validate results against real-world data. - Apply sensitivity analysis and scenario-based decision-making in medical simulations. - Work in groups to present case studies on healthcare simulation.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching & Learning Strategies – استراتيجيات التدريس والتعلم - Lectures to introduce theoretical concepts. - Practical labs with simulation tools (MATLAB, AnyLogic, Python). - Case studies and problem-solving sessions. - Midterm and final exams. - Group projects and presentations.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem)		**Structured SWL (h/w)**	

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes				
	Assignments				
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam				
	Final Exam				
Total assessment					

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Simulation and Modeling – Role of Simulation in Healthcare
Week 2	Types of Simulation Models (Discrete, Continuous, Hybrid) – Medical Applications
Week 3	Modeling Principles, Concepts, and Levels of Abstraction in Medical Systems
Week 4	Data Collection in Medical Contexts – Patient Records as Model Inputs
Week 5	System Identification in Healthcare – Case Study: Patient Flow in Hospitals
Week 6	Model Development & Implementation – Example: Emergency Department Simulation
Week 7	Midterm Exam
Week 8	Translating Models into Simulations – Tools: AnyLogic, MATLAB, Arena, Python
Week 9	Simulation Experimentation Design – Example: Surgery Scheduling
Week 10	Model Execution, Simulation Runs, Output Analysis (Statistical Measures)
Week 11	Model Validation and Verification – Example: Hospital Data Comparison

Week 12	Sensitivity Analysis in Medical Simulations – Example: Patient Arrival Rates
Week 13	Simulation in Public Health – Epidemic/Disease Spread Models
Week 14	Decision-Making with Simulation – Case Study: Resource Allocation
Week 15	Student Mini Projects – Group Presentations

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to MATLAB/AnyLogic/Arena interface – running a sample medical simulation model.
Week 2	Building a simple discrete simulation in MATLAB (patient arrivals in a clinic).
Week 3	Implementing continuous models – pharmacokinetics example (drug concentration).
Week 4	Data handling: importing clinical datasets (Excel/CSV of patient records).
Week 5	Hands-on case study: modeling hospital queues with Arena.
Week 6	Emergency department simulation – using random distributions for patient arrivals.
Week 7	Midterm Exam (Practical) – basic simulation coding task.
Week 8	Developing Python-based simulations using SimPy.
Week 9	Designing experiments – parameter variation in surgical scheduling
Week 10	Statistical output analysis – generating histograms, confidence intervals.
Week 11	Model validation lab – comparing simulated vs. real hospital data (using t-tests/chi-square).
Week 12	Sensitivity analysis lab – testing different patient arrival rates in simulation tools.
Week 13	Epidemic modeling in MATLAB (SIR model implementation).
Week 14	Resource allocation simulation – ventilator/beds optimization case.
Week 15	Mini-project lab – group work on medical system simulation.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Leemis, L.M., & Park, S.K. Discrete-Event Simulation: A First Course. Pearson, 2006.	

Recommended Texts	1. Banks, J., Carson, J.S., Nelson, B.L., Nicol, D.M. Discrete-Event System Simulation, 5th Edition. Pearson, 2010. 2. Law, Averill. Simulation Modeling and Analysis, 5th Edition. McGraw-Hill, 2014. 3. Rossetti, Manuel. Simulation Modeling and Arena, 2nd Edition. Wiley, 2015. 4. Articles from Journal of Simulation in Healthcare.	
Websites		

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Machine Learning**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**IMS312**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	IMS		**College**	CSIT	
Module Leader	Garineh S. Ohannesian		**e-mail**	garineh.sarkies@uobasrah.edu.iq	
Module Leader's Acad. Title	Asst. Lecturer		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	IMS104	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**1.** To introduce students to the fundamental concepts, goals, and types of Machine Learning and its applications in real-world domains. **2.** To provide knowledge of supervised learning algorithms, including classification, Support Vector Machines, Decision Trees, K-Nearest Neighbors, and Naïve Bayes. **3.** To develop understanding of model evaluation, including Train/Test Split and performance metrics. **4.** To explain the concepts of overfitting and underfitting, and introduce Ensemble Learning as a solution. **5.** To provide a foundational understanding of unsupervised learning methods, including clustering and dimensionality reduction. **6.** To highlight current trends and emerging topics in Machine Learning, guiding students toward further study and practical applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**By the end of this module, students will be able to:** • Demonstrate understanding of the fundamental principles and applications of Machine Learning. • Explain and differentiate supervised learning algorithms, including classification, SVM, Decision Trees, KNN, and Naïve Bayes. • Apply basic evaluation techniques for machine learning models, including Train/Test Split and common performance metrics. • Recognize and address overfitting and underfitting, and understand the role of Ensemble Learning (Bagging and Boosting) in model generalization. • Understand and describe unsupervised learning methods, including clustering (K-means) and dimensionality reduction techniques (PCA, etc.). • Critically assess current trends and emerging topics in Machine Learning and identify potential areas for practical projects or further research.

Indicative Contents
المحتويات الإرشادية

1. Introduction to Machine Learning

- Definition and basic concepts of Machine Learning
- How Machine Learning works
- Goals of Machine Learning
- Types of Machine Learning (Supervised, Unsupervised, Reinforcement, Semi-supervised)
- Applications of Machine Learning in real-world domains
- Challenges in Machine Learning

2. Supervised Learning Algorithms

- Classification in Supervised Learning
- Categories of classification problems
- Types of Learners: Lazy vs. Eager
- Overview of common classification algorithms

3. Support Vector Machine (SVM)

- What is Support Vector Machine (SVM)?
- Working principle of SVM (hyperplanes and margins)
- Simple illustrative example
- Types of SVM (linear, non-linear, kernel-based)
- Real-world applications of SVM

4. Decision Tree Algorithm

- Introduction to Decision Trees
- Structure and components of a Decision Tree
- Building a Decision Tree (step-by-step)
- Splitting criteria: Gini Index
- From Decision Trees to IF–THEN Rules

5. K-Nearest Neighbors (K-NN) Algorithm

- Definition and concept of KNN
- Role of “K” in classification
- Steps of how KNN works
- Distance metrics in KNN (Euclidean, Manhattan, etc.)
- Example of KNN application

6. Naïve Bayes Algorithm

- Introduction to Naïve Bayes algorithm
- Bayes' Theorem explained
- Why the algorithm is called "Naïve"
- Simple steps of Naïve Bayes classification
- Example application of Naïve Bayes

7. Experimental Evaluation of Learning Algorithms

- Introduction to model evaluation
- Train/Test Split
- Common classification metrics
- Practical example of model evaluation

8. Key Issues in Machine Learning

- Overfitting and Underfitting
- Bias
- Computational Complexity
- Data Quality Issues and Imbalanced Data
- Ensemble Learning as a Solution
    - Types: Bagging (Bootstrap Aggregating), Boosting.
    - How Ensemble Learning addresses Overfitting, Underfitting, and Bias.

9. Unsupervised Learning Algorithms

- Introduction to Unsupervised Learning
- Clustering methods
- K-means clustering: concept and applications
- K-means algorithm (step-by-step)
- Example of K-means clustering
- Dimensionality Reduction: concept and importance
- Common Dimensionality Reduction techniques (brief overview)

10. Final Thoughts and Applications

- Summary of key concepts in Machine Learning
- Current trends and emerging topics in Machine Learning.
- Guidance for further study and research directions
- Suggested projects or practical applications for students

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Best Learning and Teaching Strategies for the Machine Learning Course:** 1. **Lectures and Presentations**: to provide students with theoretical foundations and explain key concepts in Machine Learning. 2. **Case Studies and Examples:** to illustrate how Machine Learning algorithms are applied in real-world domains. 3. **Hands-on Practical Sessions:** to enable students to implement algorithms using Python and experiment with datasets. 4. **Group Discussions and Problem:** Solving Activities: to encourage critical thinking and collaborative learning. 5. **Assignments and Mini-Projects:** to reinforce understanding and provide practice in applying Machine Learning techniques. 6. **Quizzes and Continuous Assessment:** to evaluate comprehension and track progress throughout the course.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**63**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**4**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**62**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**4**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Machine Learning
Week 2	Supervised Learning Algorithms
Week 3	Support Vector Machine (SVM)
Week 4	Decision Tree Algorithm
Week 5	Decision Tree Algorithm (continued)
Week 6	K-Nearest Neighbors (K-NN) Algorithm
Week 7	**Mid-term Exam**
Week 8	Naïve Bayes Algorithm
Week 9	Experimental Evaluation of Learning Algorithms
Week 10	Experimental Evaluation of Learning Algorithms (continued)
Week 11	Overfitting and Underfitting in Machine Learning
Week 12	Unsupervised Learning Algorithms
Week 13	Unsupervised Learning Algorithms (continued)
Week 14	Final Thoughts and Applications
Week 15	**Student Seminars:** presentations and discussions of student projects

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Introduction to Python • Install Python environment • Install essential ML libraries (NumPy, Pandas, Matplotlib, Seaborn, Scikit-learn).
Week 3-4	Introduction to datasets (CSV format). • How to read and explore data using Pandas. • Basic data splitting (Train/Test Split).
Week 5-6	Data visualization using Seaborn and Matplotlib. • Understanding data distributions, correlations, and class balance.
Week 7-8	Data preprocessing (handling missing values, normalization) • Practical coding examples.
Week 9-10	Implement basic ML algorithms
Week 11-12	Implement basic ML algorithms (continued)
Week 13-14	Model evaluation
Week 15	Mini-project: Apply all steps (from dataset loading → preprocessing → algorithm implementation → evaluation). • Student presentations/discussions of results.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Introduction to Machine Learning, Third Edition, Ethem Alpaydin, MIT Press, 2014 2. Mitchell, Tom M., and Machine Learning. "Mcgraw-hill science." Engineering/Math 1 (1997): 27.	Yes
Recommended Texts	• Christopher Bishop, Pattern Recognition and Machine Learning,Springer, 2006. • Géron, Aurélien. Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow. " O'Reilly Media, Inc.", 2022.	No
Websites	https://www.coursera.org/browse/data-science/machine-learning	

Grading Scheme مخطط الدرجات				
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